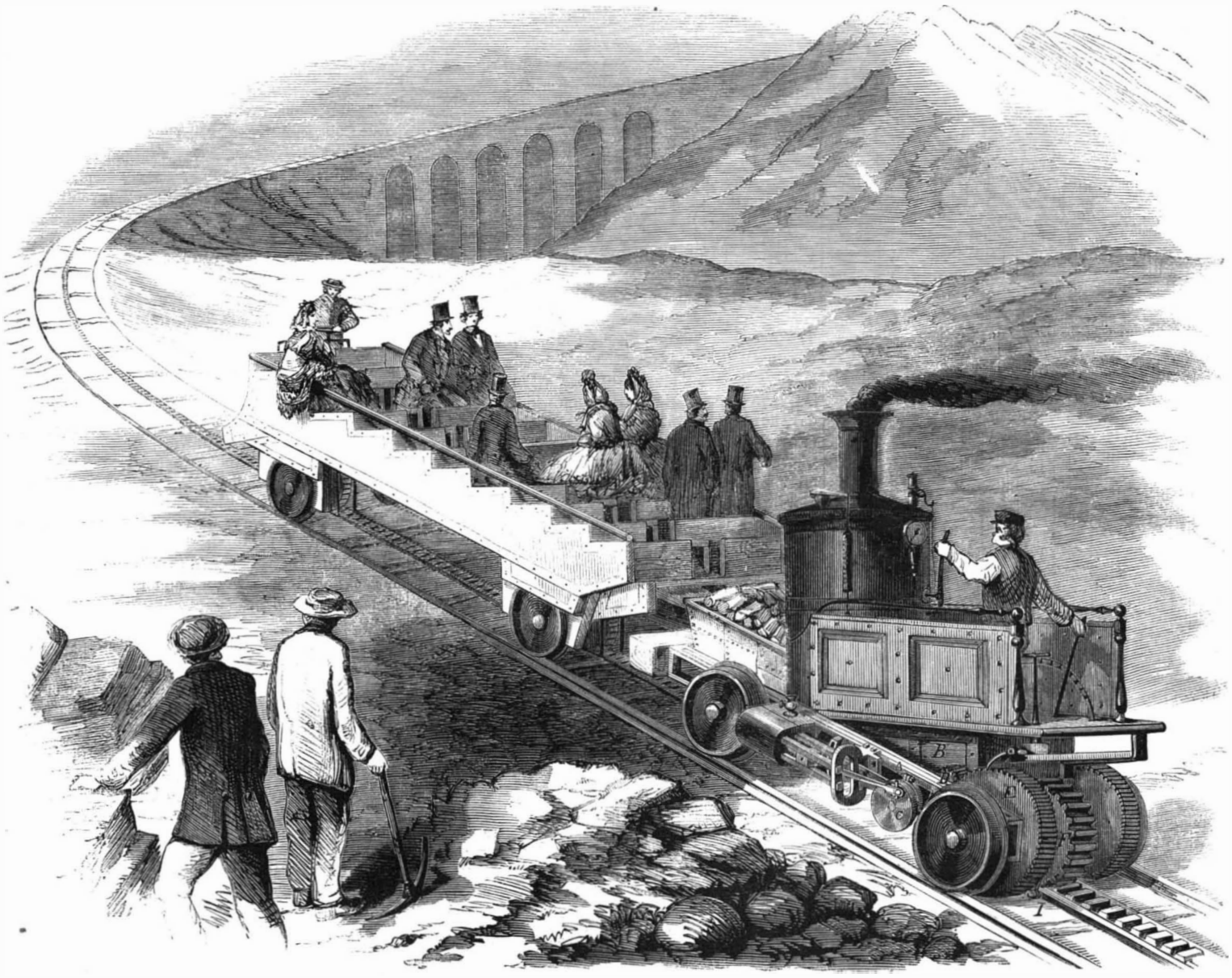
Scientific American.

A WEEKLY JOURNAL OF PRACTICAL INFORMATION IN ART, SCIENCE, MECHANICS, CHEMISTRY AND MANUFACTURES.

Vol. X.—No. 10. (NEW SERIES.) | NEW YORK, MARCH 5, 1864. | SINGLE COPIES SIX CENTS. $3 PER ANNUM—IN ADVANCE.



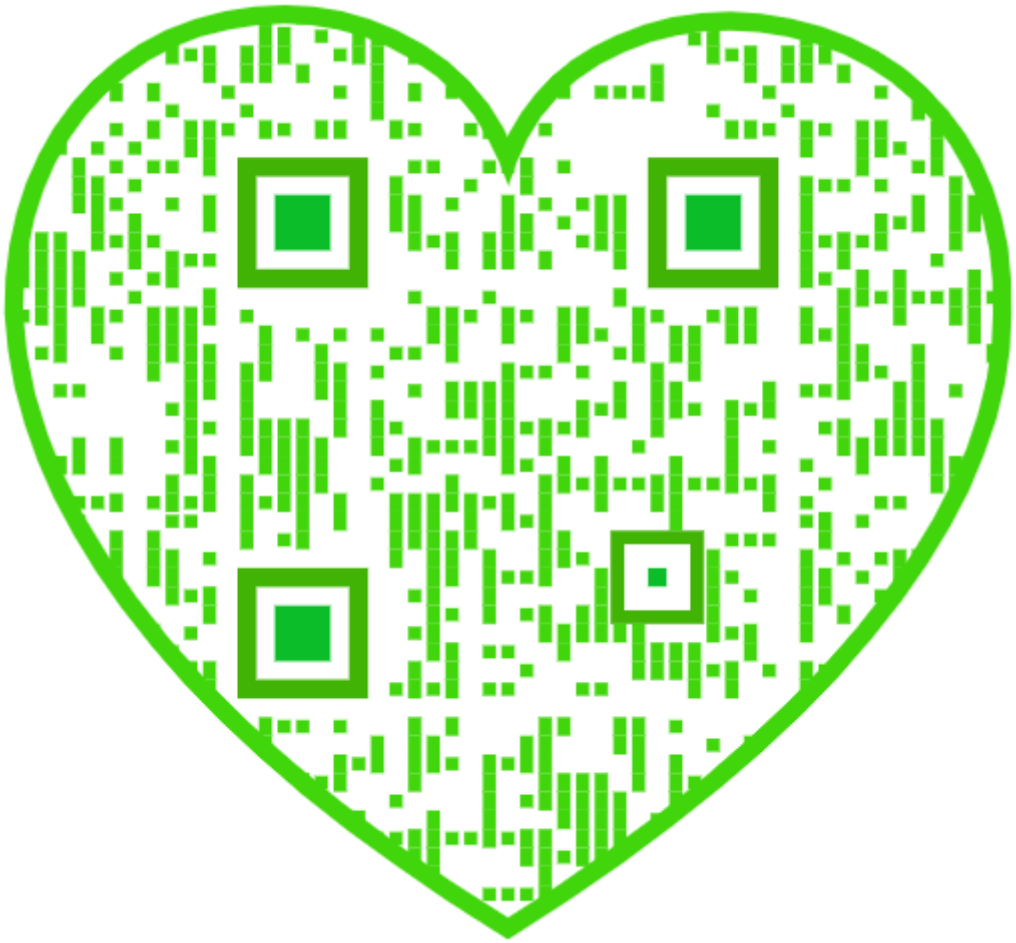
MARSH'S PLAN FOR ASCENDING THE WHITE MOUNTAINS BY STEAM.

As the cost of building railroads is very much increased by the natural inequalities of the country through which the line runs, it is apparent to the most superficial thinker that if engines could be made to disregard those inequalities and ascend or descend steep grades with as much facility as ordinary engines run over levels, one great expense in the construction of railroads would be very much reduced. The subject of ascending heavy grades by loaded cars has long attracted much attention among railroad authorities and those concerned in such enterprises, and many lines are now working wherein trains are daily drawn up acclivities of very sharp angles with the ordinary surface of the earth. These lines, however, dodge the question, so to speak, as they do not accomplish the object by the direct application of the engine to the train, but through the agency of stationary engines and wire ropes wound on windlasses. In this manner a very steep incline at Mauch Chunk, Pa., is worked. On the Baltimore and Ohio Railroad, the trains run over the Alleghany Mountains by winding along the sides in a zig-zag manner, or as a sailor would say by tacking back and forth until the summit is passed. This plan increases the distance enormously, although the object is attained.

In England this subject is attracting considerable attention at the present time, in consequence of experiments recently made by an inventor named "Fell," who, on a certain occasion, ascended a very steep incline of 1 foot in 12, distance=200 yards, and another of 1 foot rise in 13, length=500 feet, with a 16-tun locomotive and four cars loaded with 26 tuns of ballast. He ascended and descended this grade with the utmost facility; the principle he adopted being a central track between the two others, said track being gripped by two strong wheels worked horizontally, or with their axes vertical. This English plan is nothing new, as we ourselves rode on an engine (in this city) which ran in a vacant lot in 22d street, some 18 years ago, the track and engine being constructed the same as Mr. Fell's. We may add that it was the invention of an American mechanic, named "Sees," and the experiment was successful.

The engraving herewith presented represents a new plan for a "mountain" locomotive; it is the invention of Sylvester Marsh, of this city, and is intended to overcome the steepest gradients and turn the sharpest curves with facility and safety. The engine is a "pusher" and has a vertical boiler, as shown; this plan being preferable, and indeed indispensable on account of the nature of grades, or the difference which exists between them. This boiler sets in the frame, A, which also sustains the engine, the fuel, and the water tank. The fuel is carried forward and requires the services of an additional hand, or it may be carried on the foot-board of the engine if desired; the water tank is directly under the foot-board at B; it is between the frame and so constructed as to be out of the way of the machinery. The engines are of the usual locomotive pattern, outside, connected and

© 1864 SCIENTIFIC AMERICAN, INC.

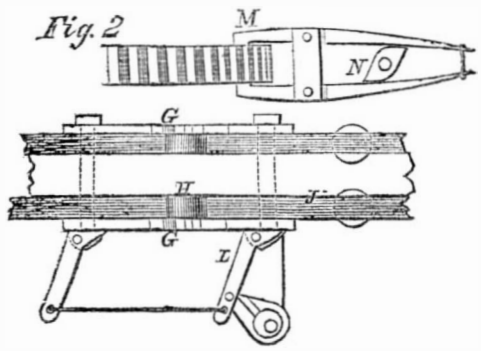


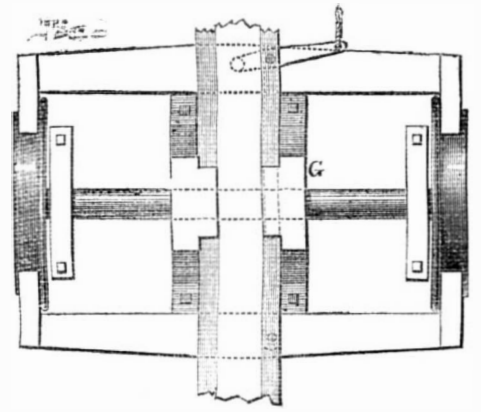
geared. As the machine is shown in the engraving it would make very slow progress, and the idea of the inventor is merely illustrated and not the actual plan of construction. The truck wheels behind will be replaced by small drivers, and the forward truck made with the usual arrangements, four wheeled, springs, &c., as in all the modern locomotives.

The gear which assists the locomotive in ascending the grade is thus arranged:—

The engines are connected to a shaft and crank at C, and upon this shaft there is a pinion, D, which meshes into the large gear, E, one of which is provided for each engine, upon this latter gear-shaft there is a large spur wheel, F, working in a rack laid between tracks. Of course when the engines are started the force exerted by them is communicated to the hind axle through the pinion, D, and thus the engine ascends. To aid the adhesion of the engine to the rails and prevent any liability of upsetting, there are two stout arms, G, underneath the engine (shown in detail at Fig. 2). which have rollers, H, on their extremities, and said rollers run on the under side of the rack-rail as at I, in the large engraving. There are also two side plates, J, having four or more wheels set in them, which grip the central track so that in

Fig. 2





addition to the mechanical power afforded by the gears mentioned previously, this central or roller frame adds very greatly to the ascensive power of the machine. This roller frame may be worked by separate engines if it is found necessary, though it is preferred to simplify the engine as much as possible by having a superabundance of piston area in the large cylinders, which can be used for the purposes set forth. This roller frame moves sideways and is thrown in and out of connection with the track at pleasure from the foot-board by the levers, L, and suitable apparatus above.

For descending heavy grades the hold-back gear, independent of the reversing or back pressure afforded by the cylinders, is thus arranged. The main spur wheel is gripped by a set of brakes as at M, Fig. 2, which are worked by a cam, N, from the foot-board of the engine; these brakes have friction rollers, and a heavy strain can be thrown on the wheel so as to retard its velocity. There are also preventer pawls as at O, Fig. 1, which must be thrown out when backing down, their principal use is to act as a safeguard in ascending. The wheels of the truck carriage under the passenger car are also rigged with the same friction gear and brakes as those described on the engine, and as the power and the strength of these parts can be increased indefinitely, they furnish efficient preventives against disaster, should the rack give way or other accident happen to the engines. There are also the usual block or wooden brakes applied to the periphery of the truck wheels.

The State of New Hampshire has granted Mr. Marsh an exclusive charter for twenty years to ascend the White Mountains by steam. The invention examined by many of the first railroad men and others of scientific reputation; these gentlemen have considered it both possible and feasible. The distance up the mountain is not over three miles, and it is intended to ascend very slowly, say in an hour. There is any quantity of timber at the foot of the mountain, and one great advantage of this enterprise would be to afford a means of taking lumber and other materials to the top of Mount Washington, for the purpose of erecting a large hotel on its summit; this hotel could be kept without the difficulties now in the way, if this road was in operation. If those who would be benefited by such an enterprise will lend their aid, it can be completed in two years. The cost will not be great, as no uniform grade is required according to this plan; thus avoiding all expense of blasting and grading for the superstructure. Letters of inquiry must be addressed to Sylvester Marsh, Esq., Box 3,047, New York City, by whom this invention has been patented.

THE MOST IMPORTANT AMERICAN DISCOVERIES AND INVENTIONS.

No. 2.

THE COTTON GIN.

Whitney.—1792.

Eli Whitney was born in Westborough, Mass., on Dec. 8, 1765. His father was a respectable farmer who worked on his own farm and had his sons work with him, but Eli always showed more fondness for mechanical employment than for labor on the farm. At the age of 12 years he made a very good violin. The most complicated piece of mechanism that had ever come under his notice was his father's watch, and he had great curiosity to see the inside of it. Buthis father would not trust him with it. One Sunday, however, he pretended to be sick, and after his father had gone to church, he went to the room where the watch was kept, and soon had the wonderful instrument all in pieces. He was a little afraid that he should not be able to put it together again, but finally succeeded so completely that his father never suspected what had been done till long afterwards, when Eli told him.

When 23 years of age, Mr. Whitney entered the "freshman" class of Yale College, and graduated in 1792. Soon after he took his degree, he made an engagement with a gentleman of Georgia as a private tutor in his family. Among his fellow-passengers on his way to Savannah was Mrs. Greene, the widow of Gen. Greene. When he arrived in Savannah, Mr. Whitney found that the gentleman who had engaged him had employed another tutor in his place. In this emergency Mrs. Greene invited him to make her house his home until he had completed the study of the law. He accepted the invitation and accordingly took up his residence at the house of Mrs. Greene, at Mulberry Grove, near Savannah. Here he soon had an occasion for his mechanical skill. Mrs. Greene was at work upon a piece of embroidery, and complained that the tambour caught her thread. Mr. Whitney made a new tambour, which greatly pleased Mrs. Greene, and was regarded by all who saw it as a triumph of ingenuity.

Soon after this a party of gentlemen, some of whom had been officers under command of Gen. Greene, came to Mulberry Grove to pay a visit to Mrs. Greene, and while there the conversation turned on the recent introduction of the green-seed cotton. It was remarked that if some machine could be produced that would clean the cotton from the seed with facility, the cultivation of this cotton would be of great value to the country.

Mrs. Greene remarked that if they wanted any machine invented they had better call on Mr. Whitney, for he could make anything. Mr. Whitney was accordingly sent for, and introduced to the company; but he disclaimed any pretensions to mechanical genius, and said that he had never seen any cotton in the seed in his life.

The idea having been suggested, however, in a few days he went to Savannah, and, after a considerable search, succeeded in finding a small quantity of cotton which had not been separated from the seed. He carried this home and in the course of two or three weeks he finished the small model of a "gin." A temporary building was then erected, and with such tools as he could find on the plantation he began the construction of a working model.

His plan was to insert a number of wire hooks in the periphery of a wooden disk, and to allow these hooks, as the disk was rapidly revolved, to enter a narrow slit in the side of a hopper near its bottom; the hooks catching the fiber and pulling it through the slit, while the seed was retained in the hopper by the narrowness of the opening. The cotton was then swept from the hooks by a rapidly revolving brush. A series of the disks were placed on the same shaft, and provided with corresponding slits in the hopper. He contemplated also forming the hooks upon the edge of a circular iron plate, and this modification was afterwards adopted.

It is remarkable that no time was wasted in unsuccessful experiments. The first simple idea conceived by Mr. Whitney has never been superseded. For 70 years his machine has been in operation. It has determined the pursuits and affected the condition of millions of persons—building up hundreds of villages, towns and cities, and changing the face of a considerable portion of the civilized world.

At Mulberry Grove was a Mr. Miller, a graduate of Yale College, a man of some means, who afterwards married Mrs. Greene. He proposed to furnish Mr. Whitney with funds to take out a patent, and build machines, for half interest in the invention. Mr. Whitney accepted the proposal, and a written agreement to this affect was signed on May 27, 1793.

Mrs. Greene had shown the gin to a few gentlemen, and as a knowledge of its existence spread in the community, the greatest curiosity concerning it was excited. Persons came from long distances to see it, but it was not thought best to show it till the patent was secured. The excitement, however, in regard to it increased, and finally, before the patent was secured, some persons broke open the building in the night, and carried the machine away. From this model numerous gins were constructed, and the machinery passed into very extensive use before the patent was granted.

Miller and Whitney committed an error quite common among inventors—that of being too greedy for enormous profits. Instead of manufacturing and selling gins, they attempted to monopolize the whole business of ginning cotton, and not having capital sufficient for this, they strengthened very much the temptation to infringe their patent rights. They became involved in debt, and finally in bankruptcy, and Mr. Miller soon died.

On the 19th of Dec., 1801, the Legislature of South Carolina passed a law appropriating $50,000 for the purchase of Whitney's patent right for that State. In December, 1802, the Legislature of North Carolina levied a tax of two shillings and sixpence on every saw in the gins in use in that State, for the benefit of the inventor; and this tax was faithfully collected and paid over, giving Mr. Whitney the principal revenue, which he received from his invention. In 1803, the State of Tennessee passed a similar law, assessing a tax of 37 cents per annum, on each saw for four years.

These sums enabled Mr. Whitney to pay his debts, and to carry on his law-suits in Georgia, where he continued to prosecute the infringers for eleven years. Though he at last obtained decisions in his favor, he never realized any income in that State from his invention.

In the United States Court, held in Georgia in December, 1807, in a suit against Arthur Fort, Mr. Whitney obtained a decision granting a perpetual injunction to prevent the use of his invention without his consent. In giving his decision, Judge Johnson remarked:—

"With regard to the utility of this discovery, the Court would deem it a waste of time to dwell long upon this topic. Is there a man who hears us who has not experienced its utility? The whole interior of the Southern States was languishing, and its inhabitants emigrating for want of some object to engage their attention, and employ their industry, when the invention of this machine at once opened views to them which at once set the whole country in active motion. From childhood to age it has presented to us a lucrative employment. Individuals who were depressed with poverty and sunk in idleness have suddenly risen to wealth and respectability. Our debts have been paid off. Our capitals have increased, and

© 1864 SCIENTIFIC AMERICAN, INC.

our lands trebled themselves in value. We cannot express the weight of the obligation which the country owes to this invention. The extent of it cannot now be seen. Some faint presentiment may be formed from the reflection that cotton is rapidly supplanting wool, flax, silk, and even furs in manufactures, and may one day profitably supply the use of specie in our East India trade. Our sister States, also, participate in the benefits of this invention ; for, besides affording the raw material for their manufactures, the bulkiness and quantity of the article afford a valuable employment for their shipping."

In 1807, the cultivation of cotton was in its infancy, and the vast effects of Whitney's invention had but just begun to be developed.

Mr. Whitney afterwards embarked in the manufacture of arms for the United States Government; using machinery of his own invention. He was the first to make each of the parts of a musket to fit the parts of any other musket.

The later years of his life were passed in the enjoyment of wealth, which he used with much benevolence. In January, 1817, he married Miss Henrietta F. Edwards, youngest daughter of Hon. Pierpont Edwards, late Judge of the District Court of the State of Connecticut. He died at New Haven, January 8th, 1825, and a fine monument, modeled after the tomb of Cæsar, is erected over his remains in the cemetery of that place. Upon it is inscribed—

"ELI WHITNEY,

"THE INVENTOR OF THE COTTON GIN."

THE GREAT NAVAL CONTROVERSY.

Donald McKay, the eminent ship-builder, has addressed a communication to Senator Grimes respecting the merits and demerits of the navy, which have so recently been brought into dispute by Mr. Dickerson in his recent tilt with Mr. Isherwood and others. Mr. McKay, with an evident degree of fairness, characterizes Mr. Dickerson's attack as unjustifiable; and he thinks "he should be punished and made an example of." The letter is very long, and so much of it as refers to personality we omit; but that portion which draws a comparison between the American and English naval vessels, in point of speed, contains matter of interest, as bearing on the controversy now going on between Mr. Dickerson, Mr. Isherwood and the lesser lights who have entered the lists:—

"Understanding that there was to be an investigation regarding Mr. Isherwood's machinery and his official course as an engineer, I present the following table of British war-steamers, with their speed at the measured mile; and I know full well what the delusion of a measured mile trial is, and know that at sea, under ordinary circumstances, they do not equal the measured mile time by at least fifteen per cent, and often more. In running the measured mile (and I have seen it done, and know all the jockeying) the sea must be perfectly smooth and no wind, the ship trimmed and made ready, boilers and fires clean, furnaces full of burning coal, and steam kept bottled up until they near the first "post;" then the valves are opened wide, and the mile is run. The tables of speed of our own naval sloops are taken from the ships' logs in a sea-way, with sea-sick firemen, and in some cases burning bad coal. I know that there are no steamers in the English and French navies of the size of the *Sacramento* class, that, under the same circumstances, are so efficient in point of speed, economy, and destructive powers. I think they admit this. We have no ships to compare with the *Mersey* and *Diadem* frigates—a class of vessels used in the British navy, which carry powerful batteries, have great steam-power, and are very fast. For instance, the *Mersey* frigate, tunnage 3,726, draught of water 22 feet 7 inches, horse-power 4,000 (the length of the stoke-hole, or boiler-room, in this steamer, is over 68 feet, having 32 furnaces); speed at measured mile, Stoke's Bay, 13·29 knots. The *Minnesota* class of frigates are their equals in armament, but not in speed.

"Our side-wheel gun-boats are far ahead of anything of the kind used in Europe, and with a light draught of about eight feet of water maintain a speed hardly, if at all, equalled by any of our fastest merchant steamers, and carry a very heavy battery. Also the screw gunboats are vastly superior to the English and French gunboats, both in speed, battery, and generally efficiency; also for operations on our coast, their very light draught of water makes them a valuable arm of offense.

"Regarding the sloops of the *Sacramento* class, they combine high speed with powerful batteries, although their exceedingly light draught of water prevents their being good sea-boats, as they will roll excessively, yet they have not their equals in the above good points in the British or any other navy. And these sloops have been presented to the public as complete failures, having very slow speed. I will present a table of the fastest screw corvettes and sloops in the British navy, having nearly the same tunnage. This table is compiled from a list of forty-seven corvettes and sloops, and is the speed made at the measured mile, and not their full speed at sea, where the conditions are changed and speed much less:—

	Tuns.	Speed per hour.
Racoon	1,467	10 knots.
Pearl	1,469	11.31 "
Pylades	1,275	10.11 "
Satellite	1,462	11.4 "

"As I mentioned above, these are the fastest of a class that correspond with the *Sacramento* and other of our new sloops, and have an average draught of from twenty to twenty-two feet of water. These vessels would be entirely unsuitable for operations on our coast, owing to their great draught of water; and having this great draught a large propeller can be used, will be deeply immersed, and can be made more efficient than with a lighter draught. This is the opinion of engineers, and has been confirmed by experience.

"The following table gives the speed of our new steam sloops of about 1,367 tuns, and with the very light average draught of about fourteen feet of water:—

	Tuns.	Knots per hour.
Sacramento	1,367	12.5
Adirondack	1,367	12
Shenandoah	1.367	12.25
Ticonderoga	1,367	12.5

"The above speeds were made at sea, and, as their officers say, ' under the usual condition of cruising ships.' We can all see that at the measured mile trial (after the manner our English friends have of getting the maximum speeds) a much higher rate could be obtained.

"Their machinery is much like the well-tried English plans, having the same valve gearing, but with 'surface or fresh-water condensers," and much higher steam can be carried by using fresh water in the boilers; also many other important advantages are gained by the use of a 'surface condenser.' And it seems that the 'Sewall condenser,' now in use on our naval steamers, is all that can be desired; at least the best in use.

"Mr. Isherwood advocates the use of a smaller cylinder and higher steam,* and is opposed to complicated machinery, made to expand the steam to its fullest extent, believing the end does not justify the means, and that it is safer and just as economical in the end to employ simple and always reliable valve machinery. The success of the English machinery is entirely due to extreme simplicity and strength. After the painful experience with the complicated machinery of the *Pensacola* and *Richmond*, it does seem that Mr. Isherwood is right in his views. We are a fast people, and want everything we have to do with to be fast. Our naval steamers are fast, yet they must go faster, even if they break down in so doing. This is the way the public feel in this matter, and the performances of the *Alabama* and her consorts have made us all crazy in matters of speed. It is one thing to see them at sea, then to overtake them, afterwards to capture them. I do not think any of these privateers steam thirteen knots, and believe they will yet be captured by our new sloops.

"I hope our navy will be efficient, as it always has done its duty, and desires that the best talent in the land shall be at the helm, but do not see that others can do any better than our chiefs of bureaus have done; that our ships and machinery are failures; or that Mr. Isherwood is incompetent because he does not agree in all points with those assailing him.

"The *Nypsic* gunboat came to the Navy Yard at Boston from Portsmouth, and her officers said 'she made eleven knots under steam, and has since been very efficient on the blockade.' The *Pequot*, a gunboat of the same class, has just returned from a trial which, from all that I can learn, has not been entirely satisfactory, and did not give the speed of the *Nypsic*. Also, the *Saco*, of the same class, now fitting out at the Boston Yard, has, like the *Pequot*, new and peculiar machinery, in both cases experiments. I mention this to show that private establishments are engineering for the navy, and without Mr. Isherwood's success."

* [This is correct. The gravest charge brought by Mr. Dickerson against the engineering capacity of the Navy Department is, that it has, through Mr. Isherwood, it schief engineer, introduced small engines, and diminished opportunity for expansion and high steam pressure in nearly all the new vessels of the navy. Mr. Dickerson denounces this method as ruinous, because attended with enormous expense without any corresponding increase of speed, and declares it to be also contrary to good engineering. He affirms that the true plan—that which the experience of nearly all engineers (Mr. Isherwood excepted) has demonstrated to be the best—is to have *large cylinders with plenty of area for working steam expansively*. The experience of engineers, generally, is as Mr. Dickerson has stated. There can be no doubt that engines of great piston area, using steam expansively, are better calculated to secure speed with economy than small engines, little expansion and high pressure. Fast vessels can be made on the Isherwood plan, but their consumption of coal will be enormous. Equally fast vessels can be built on the other plan with a great economy of fuel. Nearly all of our privately-built steamers have their engines made with a view to this economy. The example of the *Pensacola*, which Mr. McKay appears to regard as conclusive in favor of the Isherwood system, ought not to have any weight in the matter, for there are two histories of this vessel, one of which favors Isherwood and the other Dickerson ; both well sustained by evidence.—Eds.

The Committee on the Decimal System.

We see that a committee has been appointed by the House of Representatives to examine and report on the adoption by this country of a decimal system of weights and measures. It seems to us that the course of this committee is perfectly clear. Our scientific associations have been in the practice for many years of appointing committees on the same subject, and the labor of these committees have been barren of results from the fact that they wasted their efforts in long discussions rather calculated to display their own learning than to accomplish the object of their mission. Whatever may be urged against the French system, it is, to say the least, about as good as any that can be devised, and it has the very great advantage of being already in operation in a considerable portion of the civilized world. Even in our own country it is habitually used among men of science, and in scientific books and periodicals. To adopt any system other than the French would be ridiculous. To the minds of common-sense, practical men the agreement is closed. All that our Congressional committee has to do, is to ascertain exactly what the French system, as now in operation, actually is; and to report a bill for its immediate adoption in this country. The ready adaptability of our people would soon conform their transactions to the improved system, and we should be forever relieved of the vast labor of computing by our present complex and irrational methods.

A NUMBER OF THE "SCIENTIFIC AMERICAN" WANTED.—We are having numerous pressing calls for "Number *One*" of this volume. In consequence of the destruction of a train of cars by fire, on one of the Western roads, nearly our whole Western edition of "Number *One*" was destroyed, and we have none now on hand. If any of our readers, who do not preserve their numbers for binding, can send us copies of this missing number, we shall esteem it a great favor.

A GENEROUS and wealthy Englishman, Mr. George Elliot of London, has bestowed 1,000 tuns of coal as a free gift to the Sanitary Commission of this country. This donation was entirely unsolicited, and will prove a most valuable and timely addition to the resources of the soldiers' friends.

© 1864 SCIENTIFIC AMERICAN, INC.

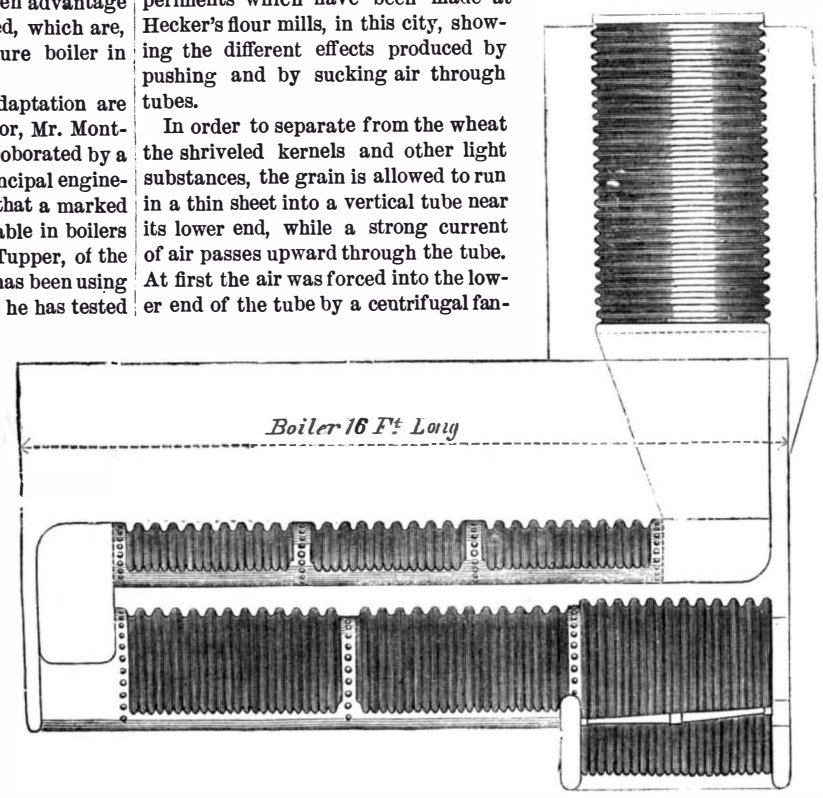
Improved Corrugated Iron Boiler.

The steam boilers herewith illustrated are peculiar in many respects; the chief point where they differ from others is in the character of the iron composing them. This iron is of the kind known as "corrugated," which means simply so rolling the sheets that instead of having a plain flat surface there are a series of arches throughout or over the whole surfaces. This method of treating boiler-iron renders it immensely stronger for the same weight of metal than a plain sheet, and this peculiarity is taken advantage of in the plans which are shown annexed, which are, a long cylinder boiler, also a low pressure boiler in section.

The advantages claimed for this adaptation are many, and it is asserted by the inventor, Mr. Montgomery—whose statements are also corroborated by a large number of certificates from the principal engine-makers and engineers of the country—that a marked improvement over old forms is observable in boilers now in use on his plan. Capt. C. H. Tupper, of the steamer *Troy* and others, states that he has been using this corrugated iron in a boiler and that he has tested it severely, having carried 150 lbs. to the square inch on an arch without a single brace upon it.

The chief points claimed for this corrugated iron are, that a boiler made of it is much stronger for the same weight; that more heating surface is afforded in the same length or dimensions in these than those made of flat iron; that being constructed wholly without braces the danger of scale collecting around the same, as in ordinary boilers, is obviated, thus preventing deterioration of the metal from this cause; and it is cheaper to make—a boiler of this iron costing about two-thirds of one of equal heating surface constructed of plain iron; and also a great economy in point of weight is manifest. The deposit of scale and sediment, which is such a source of injury to the ordinary boilers, is also claimed to be much less in this, if not wholly prevented. The mechanical reader will see, by referring to the section of the low-pressure boiler, that the corrugations extend across the crown sheet or arch, and that the expansion and contraction of the sheets, which is always going on when the boiler is "fired-up" from one day to another, and suffered to cool, does not permit scale to adhere, as from the causes above mentioned it is dislodged as fast as formed, and may be washed out with a hose and afterward drawn out of the hand holes. The use of this iron is also a guarantee for the employment of the best quality of the metal, as in the process of manufacturing the sheets any inferiority is readily perceived and the plate rejected. The boilers of the *Isaac Newton*, recently burnt on the North River, weighed 51,448 lbs., if they had been corrugated the weight would have been 36,020 lbs.; instead of being 30 feet long they would have been 21 feet 6 inches; and in lieu of the heating surface in the furnaces being 386 square feet, with corrugated iron it would have been 376 square feet. From these figures the reader will see that an obvious advantage is apparent in the use of this material. A large number of circulars, testimonials, &c., have been shown us from eminent engineers, all certifying to the value of this form of iron for all purposes where great strength, lightness and rigidity are required.

This mode of constructing boilers is the invention of Richard Montgomery, and has been secured by Letters Patent. Further information may be had by addressing Mr. Wm. A. Dodge, agent, 77 John street, New York.



MONTGOMERY'S CORRUGATED IRON BOILER.

EXPERIMENTS OF DRIVING AND OF DRAWING AIR THROUGH TUBES.

At the last meeting of the Polytechnic Association, Dr. Rowell gave an account of some instructive experiments which have been made at Hecker's flour mills, in this city, showing the different effects produced by pushing and by sucking air through tubes.

In order to separate from the wheat the shriveled kernels and other light substances, the grain is allowed to run in a thin sheet into a vertical tube near its lower end, while a strong current of air passes upward through the tube. At first the air was forced into the lower end of the tube by a centrifugal fan-blower. By this plan it was found impossible to raise the light grains more than eight feet, and unless the blast was nicely regulated some of the sound kernels would be carried over.

The fan was then placed at the upper end of the tube so as to draw the air upward. It was then found impossible to raise the light grain more than three feet; though this arrangement worked better than the first.

Then Dr. Rowell suggested to Mr. Hecker to substitute for the centrifugal blower a spiral fan, like a boy's windmill. This proved perfectly successful. The shriveled grains are drawn upward sixteen feet, not a single sound kernel is carried over, and the separation is completely effected. The centrifugal blower required a three-inch belt, but the spiral fan is driven by a belt one inch in width. The vertical tube terminates in a large square box, a round hole is cut in one side of this box, and the fan is placed just outside of the hole; the diameter of the fan being about one inch greater than that of the hole. The fan has four blades, each about five inches in width at the outer end, and about one foot in length.

On placing a thermometer at the lower end of the tube, Dr. Rowell found that the attenuation of the air reduced the temperature about five degrees.

Eight tuns of greenbacks were carried over the New Jersey railroad to Washington, one day last week. The money is said to be the collections of different Internal Revenue officers.

THE WORLD'S INDEBTEDNESS TO SCIENCE.

The fourth and last lecture of this course was given, according to appointment, on the 18th ult. The character of the lecture was much the same as those of previous ones which, it is almost needless to say, were of a high standard. Prof. Doremus paid a glowing tribute to Dr. Priestly as the discoverer of oxygen gas; and he then proceeded to state, in terse language, what an important element it was in the formation, not only of the globe itself, but of the plants and animals inhabiting it; three-fourths of our bodies, four-fifths of vegetation, and one-half of the crust of the globe being composed of this gas. So omnipresent and indispensable is it that it has been called "vital air," and its influence upon and absence from animated nature is very marked.

The economy of nature also occupied the attention of the lecturer; and he said that it was most beautiful to remark how the different processes went on without loss; for the gases respired by man, and which were noxious to his system, were taken up and absorbed by plants, to whose growth they were essential; these appropriate the carbon in the atmosphere and leave the oxygen, while man throws off the former and retains the latter. Experiments to prove that oxygen was essential to the perfect production of artificial light were then tried; these consisted, in one instance, of the introduction of ignited sulphur to a jar containing oxygen gas. In the atmosphere the combustion of the sulphur was but feebly supported; but in the presence of the pure oxygen it gave forth a brilliant light. A similar experiment with iron resulted happily. "Our bodies change every minute," said Professor Doremus, "from the action of this invisible but ubiquitous gas. I am not the same that I was a few minutes since, this audience is not the same; and, through the magic influence of oxygen, vigor is given to the intellect, power to the muscles, and vigor to the whole system." Professor Draper has beautifully said that this gas is "the cradle of the animal kingdom, but the grave of the vegetable one."

Some experiments with chlorine gas were next in order; and the effect this had on compounds of hydrogen—decomposition—was descanted on at some length; the great pecuniary value of this gas, as a bleaching and disinfecting agent was also alluded to. One instance of the value of chemistry, and especially the discovery of chlorine gas, to the commercial interests was exemplified in the fact that (as stated by the lecturer), before this gas was discovered, goods were sent from English factories to India, solely to be bleached; as the limited area and want of sunlight (which was formerly the sole reliance for producing white goods) precluded the possibility of doing it so economically at home. Nitrous oxide, about which so much has been published in the Scientific American, *pro* and *con*, was also highly spoken of as a means of producing insensibility during surgical operations; and the only objection to its use was the disgusting manner in which it was administered in general. The wonderful exhilarating qualities of

© 1864 SCIENTIFIC AMERICAN, INC.

this gas were commented on; and Sir Humphry Davy was quoted to prove that the "seventh heaven" must have an atmosphere of it.

The time passed rapidly with such information; and the Professor, at the close of his lecture, alluded to the want of facilities in this city for thorough scientific culture, and argued his cause with much eloquence. Judging from the frequent manifestations of approval given by the audience, there is no doubt but that it was "seed sown upon good ground." It is certainly extraordinary that, in a city like New York, this reproach should be uttered with truth. "The first battle of Bull Run" said the Professor, "was lost for want of topographical knowledge, or familiarity with the nature of the country; and the second was like unto it, for, as the authorities remarked, it was not probable another battle would ever be fought there."

The conclusion of this course of lectures is sincerely regretted by many, as the interest taken in them by the public was too marked to escape notice.

THE FARMERS' CLUB.

The regular weekly meeting of the Farmers' Club was held at their room at the Cooper Institute, at 1½ P. M., on Tuesday, February 23d; the President, N. C. Ely, in the chair.

FERMENTING WINE.

The President read a letter making some inquiries in relation to fermenting wine.

Col. Haraszthy—"During its fermentation, wine must be excluded from the atmosphere, otherwise it will become sour. We close the fermenting vats perfectly tight, and carry off the gases produced by fermentation by means of a siphon, which terminates under water in another vessel."

CULTIVATING ALMONDS.

Mr. Robinson read a letter asking further information in relation to the cultivation of almonds.

Col. Haraszthy—"I plant the almond pits in the spring, and during the season the trees grow to the hight of four or five feet. In the autumn they are budded with good varieties, and the next spring the seedling is cut off above the bud. In three years they begin to appear, and, in California, they have never been troubled with leaf-curl or mildew or anything else. The almond is a hardier tree than the peach. When I was in Wisconsin, I raised almonds there successfully, though we sometimes had the thermometer indicating 30 and 35 degrees below zero."

Mr. Carpenter—"Experience has shown that some varieties of the almond will bear this climate and others will not."

Dr. Trimble—"Is the pulp of the almond good to eat?"

Col. Haraszthy—"It is very poisonous. It is so full of prussic acid that it is a convenient source of supply for that substance."

GRASSHOPPERS IN WINTER.

Mr. Robinson—"I have here a communication saying that a farmer's club has been formed on Long Island, and, at their first meeting, the crop of a crow was presented, and it was found to be full of grasshoppers."

Mr. Carpenter—"I saw the crop, and I think there was a mistake in calling them grasshoppers. I should say they were crickets."

The President—"Will the naturalist of New Jersey please tell us whether grasshoppers live through the winter?"

Dr. Trimble—"I have seen the crop, and should call them grasshoppers not fully developed; they had only the rudiments of wings. In this state they live through the winter. They lie at the roots of the grass, where they are partially protected, and afford a favorite food for crows. One morning, during the cold weather this winter, I found, on the paved walk at my house, a fully formed katydid, frozen as hard as a bone. It was a striking object at the time, as you know the color is a bright, delicate green. I took him into the house and put him into a box, and he soon came to life. I then put him into the greenhouse, but in a few days he disappeared."

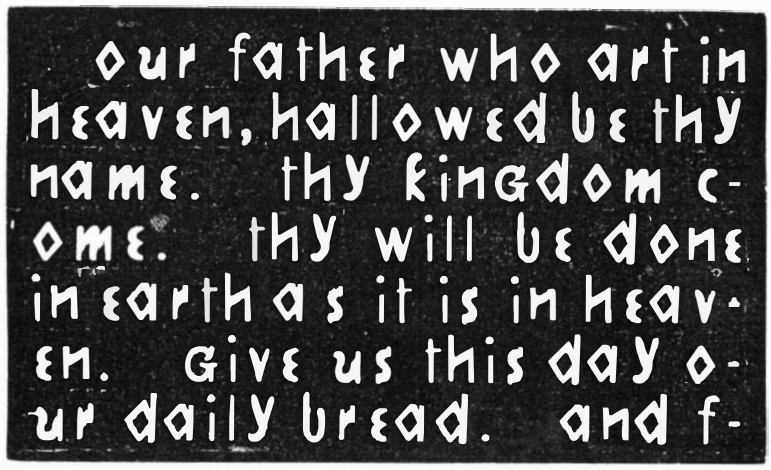
After a long discussion on the Wilson Strawberry and other subjects, the Club adjourned.

THE Fire Department of Philadelphia has 36 steam fire-engines and 38 hand engines.

WHAT INVENTION HAS DONE FOR THE BLIND.

Very few of our readers, probably, are aware of the great improvements which have been made, in this country, to ameliorate the condition of "the blind," or the name of the person from whom those improvements have originated; and it affords us pleasure to make even a brief record of some of the facts, and at the same time to pay a well merited tribute to the inventive genius of one of our own countrymen, through whose skill and untiring industry, the blind, in all parts of the world, have been so truly benefited and cheered in their sad life of "perpetual night." It is to the talent and exertions of that well-known inventor, Mr. Stephen P. Ruggles, of Boston, that the blind, in this country and Europe, have received more real and substantial good, in facilities for learning, than from any other source—or all other sources combined.

Mr. Ruggles first turned his attention to devising means for facilitating the education of the blind, as early as the year 1835, at the Perkins Institution, in Boston; and it was esteemed a most fortunate circumstance, that a gentleman of such acknowledged skill and fertility of invention should have determined


our father who art in
heaven, hallowed be thy
name. thy kingdom c-
ome. thy will be done
in earth as it is in heav-
en. Give us this day o-
ur daily bread. and f-

to devote his best energies to their instruction. He applied himself with philanthropic ardor and enthusiasm, for several years, to the careful study of all their requirements and capabilities, by constant daily observation amongst the pupils in their hours of study and recreation. The first and most important step, was, of course, to give them books. By the old method, as practiced in Europe and this country, the books were so bulky, so unwieldy and costly, as to be of no practical value. He soon became convinced that he could produce a type of less size, and less hight of face, which the blind could read with the greatest facility; providing the raised impression was hard and sharp, and the angles of the type adapted to the touch of the fingers. After many experiments he finally succeeded in reducing the size of the type and the hight of its face so as to place books, of comparatively very small dimensions, in the hands of the blind students and pupils. The size of the type now in use, the hight of its face, and the peculiar bevel of its face, are all his own invention.

He next invented and built the first press ever made for printing for the blind. The press was very powerful, giving an impression of about three hundred tuns to each sheet printed, yet was so contrived that the blind could do their own printing.

After succeeding perfectly in the construction of his type, and as well in the construction of the ponderous press for printing, a new and unexpected difficulty presented itself. There was no paper in the market adapted to this kind of printing or embossing. That which was hard enough would crack and break through when printed; and that which was flexible enough not to crack, would flatten down when pressed upon by the fingers of the pupils while reading. His reduced type required a new kind of paper. The peculiar and definite bevel, and hight of the face of the type, and the texture of the paper printed on, were most intimately connected, and it required a long series of experiments, in the manufacture of paper, to get them so harmonized as to work well together. But at last he succeeded in producing the article required.

After getting his new method of making books perfected, Mr. Ruggles next invented an entirely new mode of making maps for the blind. His plan was, a raised character, similar to his type; but arranged with such combinations that, at a trifling cost, he could produce a succession of maps of any size. Maps made in this way were never before known, and the Perkins Institution immediately issued, from this plan, an "Atlas" of the United States, and also a "General Atlas." It would, by most persons, be thought impossible that separate type could be so contrived as to admit of their being arranged in such a manner as to produce a map of any country and then to use the same type to make a map of any other country. Yet, all this was perfectly accomplished by this new invention—every piece of type matching its neighbor, with miraculous cunning, while following the crooked lines and angles, or graceful curves of rivers, coasts, islands, &c., with which such works abound.

Mr. Ruggles next produced the plates for a book on geometry, on a plan similar to his maps. These works proved very valuable and interesting to the blind—for with these books they could pursue there studies without the assistance from seeing persons which, before this, was necessary.

Mr. Ruggles's next production was a colossal globe, with the land and water, cities and towns, rivers and boundaries, &c., all distinctly marked by raised characters on its surface. This globe is thirteen feet in circumference, handsomely mounted, with a meridian and the signs of the zodiac. Astronomical problems are worked by it, and the blind scholars answer promptly all the usual questions, quite as correctly as scholars, of the same ages, in our high schools.

In the brief space allotted to this article we cannot mention all the improvements which Mr. Ruggles has made for the education of the blind; but the school apparatus, generally, now in use, is his invention. We must especially notice their slates as being very ingeniously contrived, and the constant theme of praise by those scholars who remember the "old slates."

In 1838 Mr. Ruggles went to Philadelphia and established one of his powerful presses for printing for the blind in the Institution in that city; and a year or two later placed another press in the Institution for the Blind in the State of Virginia. The perfect success of his method for reducing the size and expense of books for the blind, inaugurated a new era in the history of this kind of work, and the books were rapidly multiplied and sent all over this country and Europe. To show the effect produced abroad, by the appearance of his improvements, we quote the following from the most reliable sources:—

A French writer, formerly a teacher of the Paris school, writes thus: "The Americans have effected a revolution in the art of printing for the blind."

In a report made by order of the Belgian minister of Public Instruction, on the establishments for the Blind and Deaf, the Abbé Carton, commissioner appointed for the purpose, writes thus: "You will be able to perceive that the American print, while it is sharper and more legible, does not occupy but half the space of that of Paris."

Ramon de la Sagra, an able Spanish writer, after some discussion on this subject, which he critically examined in 1835, remarks: "As to the clearness of the relief, and the perfection of the press-work, the Boston books may be presented as models—it is the

© 1864 SCIENTIFIC AMERICAN, INC.

same as that of the geographical maps, the figures of geometry, and the musical characters."

The same author says further: "One of the branches in which the young Institution, in Boston, has made admirable progress, is beyond question, the printing of books and geographical charts in raised characters. . . . . By diminishing the characters, a page 8 by 7 inches will contain 784 letters, while it will contain but 408 of the French characters and 509 of the 8 angular characters used in Edinburgh; as I had occasion to mention in my observations on the New York Institution. Seventy-six pages of the French books make a volume two and a half inches thick, while the same number by the Boston method make a volume of but one and a half inch."

In a letter from Dr. Allston, the Superintendent of one of the English Institutions for the Blind, to the government of the Boston Institution, dated June 18, 1836, is the following: "I received yesterday the maps, books, &c., for our Institution, for which I beg you to accept my most grateful acknowledgments. I have been earnestly at work upon them all the morning, and you could not have given me a greater pleasure than you have done. . . . . I am delighted to think you are in such a fair way as to be so great a blessing to the blind. I pray God may spare you long to accomplish your great undertaking."

On page 149 we present the exact form and size of the type invented by Mr. Ruggles, and which are now used for printing for the blind; the face (or white part) of these letters being raised, in *their* books, about one-fortieth part of an inch above the surface of the paper.

It was never expected by Mr. Ruggles that his inventions for benefiting the blind would be of any great pecuniary value to the inventor, because of the very limited demand for everything used by them; but he has realized a large fortune from the sales of numerous patents and patent rights, granted him in this country and Europe, for a great variety of useful devices of the first importance in many of the industrial arts.

A Terrific Boiler Explosion.

The Troy *Times* has the following in reference to an explosion at a paper-mill in Schuylerville, Saratoga county, last week:—

"This explosion proves to be one of the most destructive boiler accidents that ever occurred in this vicinity. Indeed, we doubt if a parallel can be found to the eccentric and fearful course which the mass of iron, live coals, hot water and steam pursued on this occasion. Usually the explosive force is expended in an upward direction. This paper-mill boiler moved horizontally, with fearful velocity, passing like an iron-clad ram, or a combination of two hundred pound shot, through eleven buildings, wrecking them as completely as if an earthquake had toppled them over. The calamity took place at two o'clock on Saturday morning, when many of the structures were filled with slumbering occupants, all unconscious of danger; and it is really wonderful that scores of people were not killed and wounded. Thus far only two of the victims have died, but several others were injured.

"There were two large boilers in the paper-mill. A fireman, residing in Victory, took charge of the steam apparatus at midnight; receiving directions to allow the pressure to run down from one hundred and twenty-five to one hundred and ten pounds. At two o'clock, just as he had passed the mouth of the east boiler to attend to the other, the former exploded, knocking him down; the steam pouring across the spot where he had been standing a few moments before. The boiler, with a terrific report, started from its place in the mill, taking a northerly course, and passing through nine buildings, all of which, except the last, were demolished. The pecuniary damage by the calamity cannot be less than $100,000."

To Whom it Concerns.—Some master-builders and others, having asked bids for jobs of stone-work from different members of the Stone-cutter's Association of Cincinnati in cases where but one person could get the work, the members have felt compelled to charge a commission of one per cent. on all estimates, as a great deal of time is lost to the unsuccessful bidders. Where the bid is accepted no commission is charged.

Correspondence

Strength of Steam Boilers.

Messrs. Editors:—On page 134, present volume of the Scientific American, you inserted a letter signed "T.W.B." disputing the correctness of the tables I sent you on the strength of steam boilers. (See page 71.)

Your correspondent says that "the error pervading the formula referred to, consists in taking the rings of the cylinder as of sufficient strength and stiffness to retain their shape if the continuity of the circle were cut." With all due deference to your correspondent, I beg to say that the tables were based on no such absurd theory, as we reckon the rivets have some little to do in assisting to keep the rings together, at the place where the continuity of the circle is cut." He also says that "the force to rend it asunder is as the semi-circumference and not as the diameter." To prove this as simply as I can, describe a circle on any given diameter, and from the centre draw radii, say one inch apart at the circumference; and we will suppose that each of thse radii represents the steam pressing from the centre outwardly on the shell of the boiler. Now if we wish to tear the upper semicircle away from the lower one, it will be evident by looking at the figure, that as the radii recede from the perpendicular, their force is decreasing as a *lifting* power, and only act directly to tear asunder that part of the boiler to which they are at right angles. If, however, we raise perpendiculars an inch apart, from the diameter, we get the only correct number acting directly to tear the upper and lower semicircle apart; and so with any other semicircles in the boiler, showing that we must calculate from the diameter, and not from the circumference.

My object in sending you the tables was not so much for the purpose of correcting error—the principle being generally understood—as to give a simple and useful rule, by which any mechanic, who only knew how to work out a simple question in division, might be able to know something about the safe pressure to put on boilers, and so that he might feel perfectly safe by working within certain limits; whilst he would also know that by exceeding them life and property would be endangered. As, however, actual experiment has proved the correctness of the principle, my tables may be depended upon as being strictly within the limits of truth: and I therefore think your correspondent makes a bold and random assertion when he says: "The error thus noticed is general and has been (and may still be) the cause of numerous explosions."

Wm. Toshach.

[We agree with this correspondent in his deductions and we inserted the letter alluded to in accordance with our principle to hear all sides.—Eds.

Schenectady, N. Y., Feb. 23, 1864.

Manufacture of Charcoal Iron in Baltimore.

Messrs. Editors:—Messrs. Stickney & Co.'s Lazaretto Furnace, located at Lazaretto Point, opposite Fort Mc. Henry, Baltimore, is now producing an average of 40 tuns of iron per week. The furnace is 9 feet diameter of bosh, and the hearth and in-walls are of Berry's premium fire-proof brick. It is worked with hot blast. The blowing cylinder is 45 inches in diameter with 5 feet stroke, and is driven by an engine with a 10-inch cylinder, 3 feet 6 inches stroke. There are also 7 kilns for burning charcoal, each 12×40 feet, and 18 feet high to the top of the crown, making a capacity for 60 cords of wood. The iron produced at this, as well as other furnaces in Baltimore, is all made with charcoal, from the Baltimore county ore, which has been pronounced by judges equal if not superior to the ore found in adjacent States. The Baltimore charcoal iron is used chiefly for rolling armor plates for our iron-clads.

John Godfrey.

Baltimore, Md., Feb. 13, 1864.

The Paris *Presse* computes the population of the world at one thousand millions, speaking three thousand and sixty-four languages, and having eleven hundred different forms of religion.

PROGRESS OF AMERICAN INVENTIONS ABROAD.

There is one thing that apparently never ceases; and that is the progress of Invention. Wars may interrupt commerce, society may be upheaved by radical changes, even the very face of the country itself may be, by storms or other causes, laid waste and desolate; in spite of all, Invention, the impersonation of a new order of things, steadily forces its way over every obstacle. To the remotest corners of the globe American genius has penetrated, and in countries long forgotten of the arts may now be heard the busy hum of our cotton machinery—may be seen the quick and economical steam engine; and in many other ways the might and energy of American ingenuity is made manifest. In spite of some adverse circumstances, such as the depreciation of the currency, and the existence of war, the productions and inventions of our countrymen meet with favor abroad; and instead of losing ground, they enjoy increased popularity. Our deductions on this point are drawn from observation; the proof of them is to be found in the appended list, which we publish in accordance with our promise to give the latest intelligence respecting valuable improvements in the mechanic and other arts and sciences, which have advanced the world so much:—

Application of Power to Steam Engines, &c.—Patentees: P. Dickson of Utica, and W. A. Jones, of Winona, Minnesota.

This invention consists in imparting rotary motion without the use of a crank, or having dead points to overcome. By the adoption of a series of dogs arranged to operate on the inner side of the rim of a wheel, a continuous rotation of a shaft or pulley is kept up. These dogs can be reversed by a simple arrangement without stopping the engine, so that the shaft or other part revolves in an opposite direction. The improvements also admit of varying the power exerted by the engine so that it may be increased or decreased, as desired. These are very important additions to the usefulness of the steam engine, and render it still more valuable.

Automatic Toy Figures.—Patentee: Enoch R. Morrison, of New York City.

The greatest excitement was caused by these little automatons last winter, and they are still quite popular. By a train of clock-work motion is communicated to a pair of eccentrics which, being connected to a set of feet, cause the figures to which the clock-work is attached to move from place to place until the force of the spring is lost. These figures are neatly dressed and make a very handsome appearance.

Apparatus for drying Grain.—Patentee: Peter C. Schuyler, of New York City.

This very much needed invention consists in arranging a number of sieves or gratings one above the other, inclined in opposite directions in such a manner that when the grain is carried to the top by an elevator, and a reciprocating movement is imparted to the sieves, the grain will run down from the highest to the lowest one. Currents of heated air pass through this shower of grain, and coming in contact with each kernal deprive it of moisture, rendering the produce fit for storage or transportation.

Machine for transmitting Power.—Patentee: J. F. Rochow, of Brooklyn, N. Y.

This patent relates to an improved method of transmitting power to steering or hoisting apparatus. The arrangement consists of two cog-wheels, having an equal or an unequal number of teeth, one firmly secured to the drum of a steering wheel, the other stationary. In combination with these wheels are pinions attached to a tumbling shaft so that by the rotation of the same through the action of the pinions and the differential wheels before spoken of, a slow rotary movement is imparted to the drum itself. Very great power is gained by this arrangement.

Projectiles and Fuses.—Patentee: Isaac P. Tice, of New York City.

This patent relates to an improved method of protecting fulminates of silver and mercury from explosion by careless handling, or accident; to this end small quantities of curled hair, wool, cotton or sawdust, are mixed with, or interposed between small quantities of the fulminate; also in lining the chamber of the shot containing the fulminate with cloth or cotton; also dividing the chamber into different compartments, whereby the force of concussion is reduced and danger of premature explosion from dropping

© 1864 SCIENTIFIC AMERICAN, INC.

much lessened. Another part of this invention consists in constructing percussion fuses with a quantity of sand, or emery, locked up, or shut off from communication with the fulminate, so that the same is not in danger of explosion until the shot strikes the object aimed at. There is also an improved arrangement for preventing windage of the shot and obtaining rotary motion of the projectile through the gun, all of which are additions to the long list of improved projectiles for which the war has created a demand.

Sewing Machine.—Patentees: F. W. Grote and C. O. Tietjen, of New York City.

This invention consists in a novel device for extending the loops of the upper or needle thread on the under side of the material sewed and carrying the locking thread through them. Also in a novel construction of the feed apparatus; also an improved "take-up" for drawing up the slack of the loops of the upper thread through the cloth sewed. Also an improved arrangement of the tension; these several parts constitute a new and efficient sewing machine.

Attaching Metallic Eyelets to Cloth, &c.—Patentee: Charles E. Howard, of Bridgewater, Mass.

This invention relates to an improved method of applying and fixing metallic eyelets securely in cloth, leather, or other material. The machine is self-feeding, and by placing a number of eyelets in a box and working a treadle with the foot, the eyelets are delivered under a die which closes them over. All the motions are obtained from the treadle, and the work is most expeditiously performed. An engraving of this machine may be seen on page 33, Vol. VII. (new series) of the Scientific American; large quantities of them are now being made to order.

Boiler for pulping Vegetable Substances.—Patentees: W. F. Ladd, of Tarrytown, N. Y., and S. A. Walsh, of New York City.

In this improved apparatus the material to be reduced to pulp is treated either with or without alkali, and is at all times submerged in the liquor or solution employed in the boiling process. By an arrangement of a perforated diaphragm in the boiler the material is kept at a certain point while the liquor rises above it, and the heat is applied either by a coil of steam, or by a travelling furnace arranged to run back and forth under the boiler; this furnace can be removed when it becomes necessary to stop the boiling; the contents can then be discharged through a gate into any suitable receiver.

Projectiles for Ordnance.—Patentee: C. W. Stafford, of Burlington, Iowa.

This patent covers what is known as the "Stafford shot and shell," a projectile which is now much used in Government service. These shot and shell are steel bolts, solid for the shot and bored out for the shell, surrounded by a wooden casing to reduce windage, and obtain increased velocity of the bolt by having a small punching area, combined with a large superficial area exposed to the action of the charge. There is also a peculiar flange at the base which is packed with twine or hemp and saturated with tallow. This prevents windage and, in connection with the flange, causes the shot to rotate in the bore of the rifle. An engraving of these shot and shell can be seen on page 209, Vol. VIII. (new series) of the Scientific American.

Obtaining Printing Surfaces, Dies and Substitutes for Photographic Negatives.—Patentees: Paul Schulze, and Frederick W. Billing, of Brooklyn, N. Y.

The object of this invention is to procure a cheap substitute for wood engraving, so that by the aid of the electrotype process surfaces can be obtained which may be printed from. To this end a composition of various substances is employed which may be coated on glass, metal, or precious stones, and by subsequent processes, such as washing, being submitted to the action of acids, etc, the drawing is brought out in relief or the design is sunk in the material worked as may be desired without cutting any of the design by hand. Processes of this nature are exciting much interest at this time, and it is believed that ere long the costly and slow labor of wood engraving will be superseeded by quicker and cheaper methods.

Machinery for cutting Corks.—Patentee: Isaac Goodspeed, of Norwich, Conn.

This ingenious invention relates to an improved means of cutting bottle or other corks out of slabs of the same, either cylindrical or of any desired taper. This is done by the use of changeable patterns attached to the spindle carrying the cutters. The cutters are applied to the spindle so that they have a motion lengthwise, while they and the pattern also have a rotary motion given by the carrying spindle. By using double patterns, so that the cutters are held at different distances from the carrying spindle, a shell or ring-shaped cork may be cut without waste as the centre cork can be used for a stopper also. There are also ingenious arrangements for adjusting the cork-bark and holding it while worked upon, which renders this machine a most useful one.

MISCELLANEOUS SUMMARY.

Statistics of Ardent Spirit Manufacture.—The total value of all kinds of distilled liquors made in the United States in 1860, was $24,243,171. The State of New York stands first of all the States as the manufacturer of whiskey, highwines and alcohol. Illinois stands next and Ohio next. Kentucky, where all the "Bourbon" is supposed to come from, makes but 3,000,000 gallons of whiskey, highwines and alcohol. The whole country produces less then 3,500,000 gallons of gin and brandy per annum, and about 4,000,000 gallons of what is called New England rum. The total value of malt liquors manufactured in the country, in 1860, was $18,001,125. New York manufactures more malt liquors than any other State; Pensylvania stands next, Ohio and California are the great wine-producing States as yet; the former producing, in 1860, 562,640 gallons, and the latter 494,516 gallons.

A Philadelphia exchange represents that the coal companies are busily enlarging their facilities in every direction, and that the product of coal in 1864 will be greatly increased. The article concludes thus:—"Not only Pennsylvania capitalists, but those of New England and New York, are actively engaged in the enterprise. The price of coal must fall." [No doubt it will, in summer, when no one wants it.—Eds.

A terrible accident lately occurred in St. Louis, at the launch of an iron-clad. The vessel went off the ways suddenly, and the anchor being thrown over, several persons were caught in the coils of the chain attached to it and drawn overboard. Only one of them, however, was drowned.

Another death from inhaling nitrous oxide gas, recently occurred in Vermont. The victim was a young girl, seventeen years of age, remarkably robust in constitution and health. Deaths from the employment of this agent seem to be multiplying rapidly.

Applications have been filed with the Controller of the Treasury Department for 215 National Banks. This new system of banking is becoming very popular; and at the rate it is progressing, it must soon altogether supplant the State system.

Mr. G. Leverich, of Trenton, N. J., is the *agent*, simply, of Powers's Rifling Machine, recently illustrated in the Scientific American (page 113), and not "sole agent and maker," as therein stated.

A large fire which recently occurred in Gloucester, Mass., was only checked by the timely arrival of a steam fire-engine; the hand-engines being frozen up and disabled.

$15,000,000 worth of gold dust, it is reported, is now in Idaho territory, awaiting transportation to the States.

Four "blockade-runners" were recently destroyed off the coast of Florida and North Carolina, by the *Sassacus*, a new naval vessel.

Engineers desirous of entering the Volunteer Navy may apply immediately, in person, to the Chief Engineer of the Yard.

The Iron Propeller "Havanna."

Messrs. Neafie & Levy, of Philadelphia, Pa., are now building a large iron propeller of 1,336 tuns; the length of the vessel is 240 feet, breadth of beam 34 feet, and depth of hold to spar deck 22 feet; draft of water at load line, 15 feet 6 inches. The frame is constructed of wrought-iron plates, 7-8ths and 1-16th thickness on an average, and is fastened with 3-4th rivets 2½ inches apart; the floors are shaped something like the letters Z and an inverted L, and are molded 4 inches, sided half an inch. The frames are 18 inches apart at centers. There are also three water-tight bulkheads, and the beam-ties on the spar deck are of wrought-iron plates.

The ship is to be driven by one of Mr. John Baird's engines, having a vertical cylinder of 60 inches diameter, and 5 feet stroke of piston. There are two tubular boilers in the hold, having water bottoms and lagged with felt. The propeller is cast-iron, is four-bladed, and is 15 feet in diameter. The ship is built according to the most approved principles, and is expected to be creditable to all concerned in her construction.

RECENT SOUTHERN INTELLIGENCE.

Since our last issue we are in receipt of a file of Richmond and North Carolina papers, from which we select the following items:—

Gold is quoted by the Richmond *Examiner* at twenty-two hundred per cent premium and silver at nineteen hundred. One hundred dollars in gold will buy $2,200 of Confederate Seven-per-cent Bonds!

The bakers have increased the price of baker's loaves from fifty cents to one dollar; and at the same time, decreased the bulk and weight to about half the former size. Flour in Richmond is $250 per barrel, sugar $7 to $8 per lb."

"The Richmond quotations of prices current go all over the Confederacy; and in a great measure regulate the value of produce everywhere. If flour goes up in Richmond any day ten dollars a barrel, it will go up in Buchanan the next day about the same amount; although, but for the Richmond rise, the price in Buchanan might have remained stationary for six months. The case is the same with all commodities, including money. Distance and circumstance may modify the proposition as to particular localities; but, as a general rule, the market quotations at a great centre of commercial operations and intelligence like Richmond, exert a controlling influence over prices throughout the Confederacy."

"A dozen cases of runaway slaves are almost daily reported to the police. The abscondings of slaves are increasing in number and frequency, and the owners of such migratory and uncertain property must look to their whereabouts."

"Richmond is the Southern 'Mecca,' and everybody a pilgrim, it would seem. The hotels are full; the boarding-houses are overflowing. There is nothing to eat and not a room for rent, yet everybody has a contented stomach and a couch to stretch himself upon. It has, ever since the war, been a mystery what important business brings everybody and his kin to Richmond. One would suppose the stupendous price of living would drive them away or hurry them back, if they must come. On the contrary it woos them, and foolish people rush into Richmond like crazy craft into the vortex of a mælstrom. What it is they find so attractive in Richmond is an inexplicable puzzle to sensible, plodding folks. It may be for the experience of the indescribable sensation of living at the rate of twenty or fifty dollars per day at the hotels; of drinking 'blue ruin' at the rate of two dollars at the restaurants; of being pulled up every half-hour by the 'conscript hawk' or driven distracted by the music of the iron keys of the Jeff. Davis pianos; or being robbed once in every twenty-four hours, with the nightly chance of a knock-down or a tumble into the Basin. If these are not the attractions, our query 'What brings so many idle people to Richmond?' is still unsolved."

"Many of the fattest and bravest men in the Confederacy are afraid to go into the army lest they should be unwieldly or incapable of rendering service. This is a mistake. Some exceedingly fat men are now in the service. Gen. Humphrey Marshall served for two years. But to set the matter at rest, we need only cite the example of Chiapin Vitelli, one of the ablest generals who accompanied Ava to the Netherlands. Stroda says of him: 'He was equally distinguished for his courage, his cruelty and his corpulence. The last characteristic was so remarkable that he was almost monstrous in his personal appearance. His protuberant stomach was always supported in a bandage suspended from his neck; yet, in spite of this enormous impediment, he was personally active on the battle-field, and performed more service, not only as commander but as subaltern, than many younger and lighter men.' Be of good cheer, therefore, fat men; procure your bandages, and go in!"

© 1864 SCIENTIFIC AMERICAN, INC.

Improved Press for Printing for the Blind.

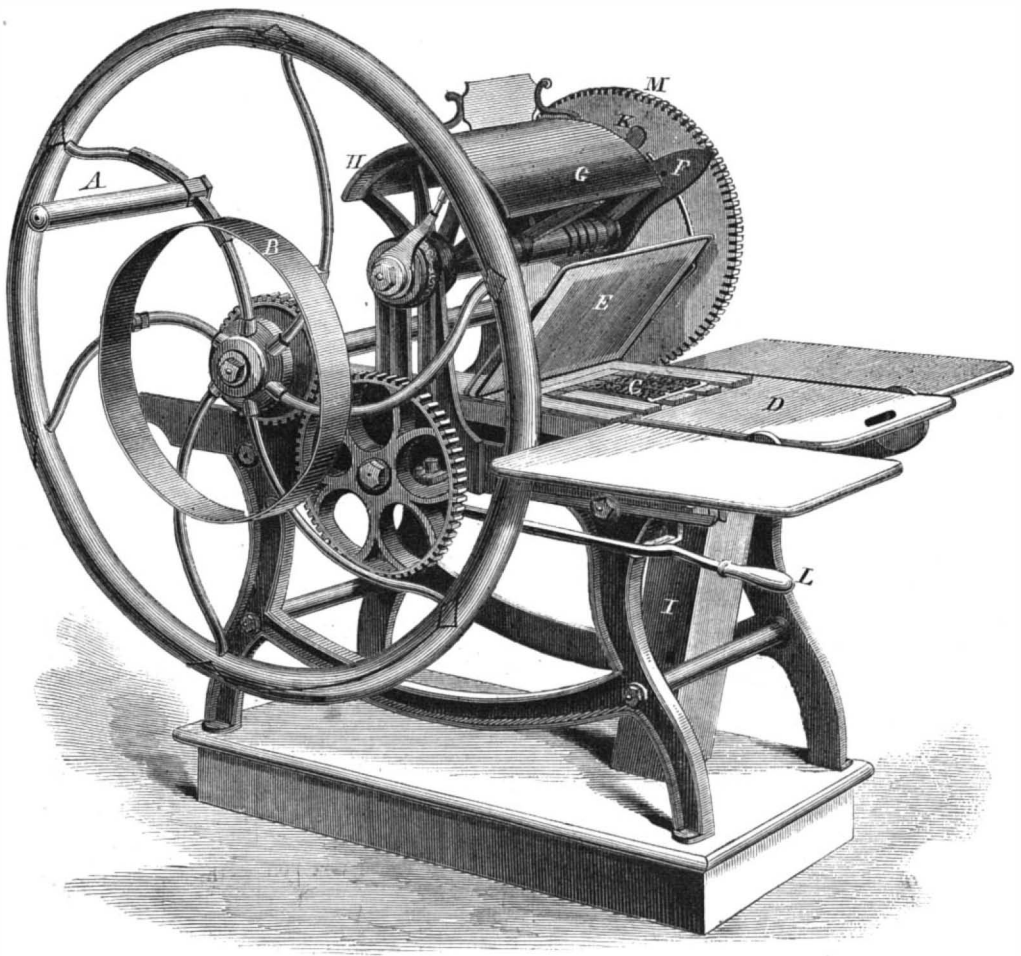
The annexed engraving represents an improved press for printing for "the blind;" this press was recently invented and manufactured by Stephen P. Ruggles, of Boston, and it was exhibited at a meeting of the Massachusetts Institute of Technology, on the 10th of Dec., 1863; said press being much larger and far superior to those first built by him, for the same purpose, many years since.

The press now illustrated was invented and built expressly for the American Printing-house for the Blind, in Louisville, Ky., which institution has a large fund subscribed, to be expended in giving books to all the blind persons in the United States.

The press is put in motion by turning the fly-wheel by means of the crank, A, or by a belt on the pulley, B; the fly-wheel moving in one direction all the time. The sheet to be printed is placed on the form of type, C, which rests on the bed, D, and over which the india-rubber tympan, E, shuts down as said bed moved forward. The cam, F, as it revolves, with the gear wheel, M, comes in contact with a lever, which causes the bed to start very slowly from its state of rest, but increases its speed so that it soon acquires the same velocity as the surfaces of the cylinder (not seen in the cut) and the segment of the cylinder, G, between which it passes for the impression to be made on the paper. When the rear end, H, of said segment, has passed its lowest center, the bed is relieved and drawn back to the position shown in the engraving, by a weight attached to said bed by a strap; said weight running down in the inclined spout, I. The strap is wound on a snail-shaped pulley to give said weight its greatest power of leverage to start the bed back quickly, and its least power to resist the bed's motion forward. The cam, F, may be so adjusted on the gear wheel, M, that only a small portion of the segment, G, will be brought into use when a small form is to be printed, thereby allowing the press to run very rapidly and yet afford sufficient time to lay the sheets to be printed. The journals of the shaft of segment, G, run in eccentric boxes, to which the levers, K K, are attached, and by moving said levers, back or forth, said shaft and said segment may be raised or lowered to regulate the impression. L is the throw-off shipper, and is so related to the lever with which the cam, F, comes in contact, that the bed may, when desired, be prevented from starting forward, for an impression, while all other parts of the press are in operation.

On another page (149) will be found an article headed "What invention has done for the blind," which our readers will find interesting.

Further information can be had by addressing S. P. Ruggles, 152 Washington street, Boston, Mass.



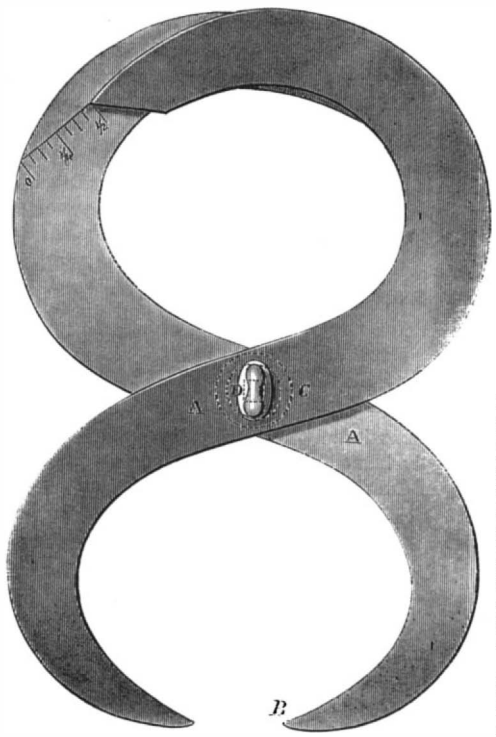
NEW PRESS FOR PRINTING FOR THE BLIND.

Big Pig.

We do not generally find room in the Scientific American to record all the achievements of our agricultural friends, in the way of huge vegetables, prize animals, &c.; but, for once, we are compelled to confess ourselves unable to do justice in type to the most enormous hog we ever set eyes upon. This beast looked (he is dead now) more like a polar bear than a pig, his live weight being 1,355 pounds, and his age four years; his back was waist high to an ordinary man, and his length nearly six feet. His ham would not go into a barrel, and must have been a heavier load than any ordinary person could stagger under. Two tusks curved gracefully outward from the under jaw of this hog, and would have been very long, no doubt, if they had not been broken off. The hide and hair of this ponderous animal alone remains for mankind to gaze upon, his flesh is scattered among the "gentiles." In the *American Agriculturist* Office his swineship's stuffed effigy may be seen, at morning and at evening, gazing at the California pear, a fit companion in size for him. This big pig was raised by Mr. Benham, of McLane County, N. Y., and is part Berkshire and part Byfield stock.

Morse's Self-Registering Calipers.

Perhaps the tool most universally employed by machinists is a pair of calipers; from taking the size of



a drill or a rod, up to turning a shaft, they are in constant requisition, and are quite indispensable. The instrument herewith illustrated is of the class known as registering calipers, and by a very simple arrangement of a scale on each side of one pair of the legs, A, the distances of the points, B, are accurately measured. This is a very convenient form of self-registering calipers, as the workman can see, by a glance at the scale, the size required, without being obliged to carry a rule in his pocket. The construction of the calipers will be readily understood by every mechanic at a glance, and it is unnecessary to dilate upon this point. The joint, C, is not riveted but has a thumb-screw, D, which screws into the washer on the opposite side, thus affording a ready means of keeping the joint in good order; there are no projecting points, or other details, about these calipers to render them liable to catch in or wear out the pocket, and we recommend the calipers to our mechanical readers who use such instruments. The invention was patented on Nov. 8, 1863, by Wm. A. Morse. For further information address him at Box 2,897, Boston, Mass. [See advertisement on another page.]

Profits of Steamboating.

When Cornelius Vanderbilt was a young man, his mother gave him $50 of her savings to buy a small sail-boat, and he engaged in the business of transporting market-gardening from Staten Island to New York city. When the wind was not favorable, he would work his way over the shoals by pushing the boat along by poles, putting his own shoulder to the pole, and was very sure to get his freight into market in season. This energy gave him always a command of full freights, and he accumulated money. After a while he began to build and run steamboats, and he is now reputed to be worth more than nineteen millions of dollars, after making the Government a present, as a free gift, of a steamship that cost $800,000!

India-Rubber Extension Case Before Congress.

We learn from Washington that parties are at work to obtain from Congress an extension of Goodyear's india-rubber patent right. This right has already had two extensions, and the company has amassed twenty-five millions of dollars. It is now proposed to give it a seven years' further lease of extortion upon the people and Government of the United States, and a chance to accumulate twenty-five millions more. This is one of the biggest patent-right operations of the times. The Government is obliged to pay enormously for everything manufactured out of this patented rubber fabric in the shape of soldiers' blankets, clothing, and the numberless articles of comfort and convenience required for the use of soldiers in the field, whereas, if their manufacture were left open to competition, the cost would be greatly less. Why do not the newspaper correspondents in Washington watch and expose these things? If the correspondents of the Associated Press were worth a button they would do so without a hint from any quarter.

[We copy the above paragraph from the *New York Herald*. Outside of those who are engaged in the manufacture and sale of india-rubber goods, there is scarcely a person in the country who does not pay more or less tribute to the gigantic india-rubber patent monopoly; consequently nearly the whole population is interested to prevent the extension of the patents. We think we are safe in saying that the india-rubber patents are by far the most valuable of any now existing. We shall refer to this subject again with a hope that we may be able to defeat the scheme.—Eds.

© 1864 SCIENTIFIC AMERICAN, INC.

THE

Scientific American.

MUNN & COMPANY, Editors & Proprietors.

PUBLISHED WEEKLY AT
NO. 37 PARK ROW (PARK BUILDING), NEW YORK.

O. D. MUNN, S. H. WALES, A. E. BEACH.

VOL. X. NO. 10..[NEW SERIES.].....*Twentieth Year.*

NEW YORK, SATURDAY, MARCH 5, 1864.

Contents:

(Illustrations are indicated by an Asterisk.)

Marsh's Plan for ascending the White Mountains by Steam..... 145
American Discoveries and Inventions..... 146
The Great Naval Controversy..... 147
The Committee on the Decimal System..... 147
*Montgomery's Corrugated Iron Boiler..... 148
Driving and Drawing Air through Tubes..... 148
The World's Indebtedness to Science..... 148
The Farmers' Club..... 149
*What Invention has done for the Blind..... 149
A Terrific Boiler Explosion.... 150
Strength of Steam Boilers..... 150
Manufacture of Charcoal Iron. 150
American Inventions Abroad. 150
Miscellaneous Summary..... 151
The Iron Propeller "Havanna" 151
Recent Southern Intelligence.. 151
*Ruggle's Press for Printing for the Blind..... 152
Big Pig..... 152
*Morse's Self-registering Calipers..... 152
Profits of Steamboating..... 152
India-rubber Extension Case before Congress..... 152
Government Artillery Experiments..... 153
Cause of Our Manufacturing Prosperity 153
The Engines of the New Frigates..... 153
The British Iron-clad Frigate, "Bellerophon"..... 154
Recent American Patents..... 154
Patent Claims.....155, 156, 157
Notes and Queries..... 158
*Clough's Window-sash Stop.. 160
*Kelly's Cartridge-tearer..... 160

ARTILLERY EXPERIMENTS OF THE GOVERNMENT.

From time to time, during the last two months, we have published reports of Government experiments on iron-clad targets; these were accompanied by accurate illustrations, which were, in many cases, photographed from the targets themselves. The experiments alluded to, were all made with the eleven-inch gun, of Dahlgren, with an average charge of 30 pounds of powder, an average weight of spherical cast-iron projectile equal to 165 pounds, and an average range of 80 feet.

Under the above-named conditions, an experiment was made upon a composite target of iron and india-rubber, backed with timber. The iron was outermost, and was 2 inches thick; the rubber came next, and was $1\frac{3}{4}$ thick; the timber was 19 inches thick—in all $22\frac{3}{4}$ inches. The target was inclined at an angle of 15 degrees; and at the first fire the shot tore through the mass and penetrated the bank behind (a solid clay) 17 feet, being but slightly damaged in its passage.

Another experiment was tried with a $4\frac{1}{2}$-inch solid scrap iron plate, backed with 20 inches of solid oak, and the iron *faced* with rubber, 4 inches thick, the whole placed against a bank of solid clay; this resulted in the destruction of the target at the first fire, the charge being 30 pounds, the projectile, spherical cast-iron, weighing 169 pounds, and the range 87 feet. The shot did not go entirely through the target, but penetrated the plate and rubber, and lodged in the second course of timber behind. The rubber was entirely forced off, by the violence of the concussion, and fell fifteen feet forward of the target.

Still another target was made, of four one-inch wrought-iron plates, backed by rubber 4 inches thick in single sheets of one inch each; the whole backed by 20 inches of solid oak. The first four inches next the timber were composed of alternate rubber and iron, two inches of each; the wrought-iron was on the outer surface of the target when fired at. The whole was placed against a bank of solid clay. The charge was 30 pounds, the shot 169 pounds in weight, and the range 84 feet; at this distance, and under these conditions, the target had two clean, handsome holes bored through it—one of which was but slightly larger than the shot itself, showing it experienced but little resistance in its passage. A repetition of the experiment, with the target inclined at an angle of 45°, produced the same result; the target being penetrated, and much more injured than when vertical. It should have been stated, previously, that the target was 96 inches long, by 42 inches wide. In a comparative experiment, to test the value of india-rubber as a resisting agent, a target was made with with 4 single iron plates, each 1 inch thick; the results, as observed by competent witnesses, did not vary materially from those obtained with rubber, and little value is attached to it as a disperser of the force of shot.

Experiments to ascertain the qualities and value of iron armor faced with wood have also been made at the Washington Navy Yard, and the result has been the complete demolition of targets and theories. Without quoting specific or particular trials, of which there have been a vast number, on targets of all conceivable and inconceivable varieties, it is enough at the present time, to note this prominent feature—the excellence of the eleven-inch gun as a battering piece. During these trials it has developed a new quality which may or may not have been known to its constructors before; but, at all events, the proven ability of the eleven-inch gun to stand consecutive charges of 30 pounds each, must add very greatly to its value as a national weapon. No target of which we have yet any report has been able to withstand the impact of its shot with 30-pound charges, although it is possible to construct one which shall defy even this assault.

The "service" charge of the eleven-inch gun is ordinarily 20 pounds; but for battering iron-plates, 25 pounds is allowed, and not over 500 fires from one vent is permitted; two vents are made in each gun, one clear through to the bore, and the other given a proper lead, and but partially drilled. When one has completed its time of serving, the other one is opened, and when 1,000 fires have been made with the weapon, it is condemned as unsafe.

Doubtless there are other guns which have been tried at the Navy Yard, and have given as good results with less charges, at greater ranges. If so, we have not heard of them; the Government advertised some time ago for wrought-iron guns, and by this time it has doubtless received one or more; whether these have been tested, or what action has been taken with them, is not known to us; but we should be glad to hear that they have proved successful, and are to be adopted. A warrantable prejudice exists against the use of cast-iron ordnance; and many and loud are the complaints, attacks, and abuse which we have received for setting forth facts in relation to it. Such a course in no wise affects us. The tensile strength of the eleven-inch gun is enormous; and it would seem not an unwise plan to strengthen it yet further, for specific purposes, by the addition of a reinforce, carefully made and properly shrunk on.

THE CAUSE OF OUR MANUFACTURING PROSPERITY.

If we enter any industrial establishment, we find the proprietors overwhelmed with orders; and this applies not only to the great manufactories of iron and wool, but all other pursuits, with the exception of the cotton manufacture. Mr. Cobden tells us that all of this apparent prosperity is a delusion; but, as Mr. Cobden is a sound political economist, we think that if he was more intimately acquainted with the facts of the case, he would change his opinion.

In looking for the real causes of this prosperity, the first consideration is the great and rapidly increasing power of the country to produce wealth. When the only inhabitants of the land were Indians, there were no modes of producing wealth, but hunting, fishing, and the rude cultivation of a few very small patches of tobacco, potatoes and Indian corn. On the settlement of the continent by Englishmen, all the arts of Europe as they then existed were introduced; and the power of producing wealth was multiplied many thousand fold. But since that time these arts have been so revolutionized that it may be a question, whether our power of producing wealth does not bear as large a proportion to that of the first settlers as their's bore to that of the Indians. In spinning the material of our clothes, the spindles are turned by steam or water; one man attending 2,000, each of which spins more yarn than a spindle turned by hand. In preparing the material for our houses, the boards are smoothed by a revolving plane; one man finishing more flooring in a day than several hundred men could "jack down" in the olden time. In the great labor of transportation by means of canals, steamboats and railroads, one day's labor accomplishes more than thousands of days' work could effect without these aids. In short, in every department of industry, the great forces of nature, operating through means of mechanism, have multiplied from 10 to 10,000 fold the power of producing wealth.

A very large portion of this increased production is consumed as fast as it is produced. Only a small fraction of the community will save anything, whatever their incomes. But a considerable portion is saved; causing a rapid accumulation of wealth. In 1840 the inhabitants of Connecticut were worth an average of 450 dollars apiece; in 1860 the whole property of the State, if equally distributed, would have given 900 dollars to every man, woman and child. In no other country in the world was so large a portion of the accumulations invested in labor-saving machinery, manufactories, and other means of augmenting the annual product. A large portion was devoted to increasing the size of our cities; this mode of investment has been generally suspended, and the revenues have been diverted to the purchase of Government bonds.

Our manufactories and workshops are not turning out froth. Their products are as solid, substantial values as were ever produced. There is no delusion about it. The simple cause of our prosperity is the vast aggregate power of the nation to produce wealth; and that has resulted from the ingenuity of inventors, and the enterprising spirit of our people, which has put those inventions in operation.

THE ENGINES OF THE NEW FRIGATES.

The new frigates about to be built by Government—the *Wampanoag*, *Ammonoosuc*, and *Nishaminny*—are intended to be very fast; they are to have fine models and enormous engine power, and are expected to be a great acquisition to the Navy Department. The vessels themselves are of an entirely different class from any previously built for the service; being immensely larger than the new sloops, with heavier engines and larger boilers than any war vessel afloat, not excepting the *Dunderberg* and *Puritan*. The size of the cylinders and stroke of piston remains the same in all the ships just named, but the plans of the engines necessitate an immense additional weight which might be dispensed with. They also occupy nearly the whole of the lower part part of the ship—247 feet out of 340 being devoted to the engines and boilers alone.

DIMENSIONS OF THE VESSELS.

The hulls are 340 feet over all, 17 feet depth of hold from water-line, and 44 feet 6 inches beam. They are not iron-clads. The models are intended to be good for speed, this quality being the first consideration. The floors are nearly flat, and there is but little bilge where the sides rise. The frames of the *Wampanoag*, building at the Navy Yard in Brooklyn, are all up; and it was intended to have launched the vessel early in the spring; but the matter is somewhat delayed, we are told, at present, and no period is fixed for the time of completion.

THE ENGINES.

The plan of the engines is horizontal. They are also geared to the screw shaft at about 2 to 1, or twice as many turns of the propeller as the engine shaft makes. The cylinders are two in number, 100 inches in diameter by 4 feet stroke of piston, and are placed horizontally, working athwart ships. The connecting-rod proceeds directly from the crosshead, as in all other horizontal engines, and takes hold of the crank-pin in the same manner. On this shaft there is a large spur-wheel, built up in 9 sections, each section being one wheel itself, having teeth of lignum vitæ, or young hickory, boiled in oil. The diameter of this wheel is 10 feet 3 and 5-16ths inches at pitch line. The pinion this wheel works in is on the main screw shaft, and is 5 feet and 5-16ths of an inch diameter at the pitch line. There is one surface condenser, which is common to both engines, and is situated between them; in this there are to be 7,168 tinned brass tubes, 6 feet $3\frac{1}{2}$ inches long. The main steam valves are slides, worked by a Stevenson link. The valve face is on the side of the cylinder, and has an enormous area—the dimensions being $84\frac{1}{2}$ inches wide by 5 feet 6 inches in length. The valve is of the doubled-ported variety, and is carried on 17 hardened steel rollers, $2\frac{1}{2}$ inches diameter and 4 inches long. These rollers run on guides, and are intended to relieve the stem from the enormous weight and friction of the valve. The steam ports are 82 inches long by $2\frac{1}{4}$ inches wide, and the exhaust ports 4 inches by the same length, of course. The central exhaust is 18

© 1864 SCIENTIFIC AMERICAN, INC.

inches wide. There will be 3 inches lap on the steam side and 1½ on the exhaust side of the valve.

THE SCREW.

The propelling wheel is fixed in its place and can only be disconnected from the engines by a clutch coupling inside the ship. The thrust is taken by a large bearing, having a number of collars, and there is also a roller bearing in addition; this latter consists of a number of steel balls working between two grooved couplings or disks. The diameter of the propeller is 18 feet, and the pitch is expanding, having a mean of 25 feet. The wheel is four-bladed, and has no out-board bearing on the extreme after-end.

THE BOILERS.

There are no less than 8 main boilers in each of these ships, having one smoke-pipe serving for two boilers, or four in all. The pipes are 56 feet high from the uptake, 7 feet 8 inches diameter for the large boilers, and 6 feet 6 inches for the two forward boilers, which are smaller than the others. The safety-valves are 8 inches diameter of opening, and each boiler has one. The boilers are of Martin's patent with a total water-heating surface of 28,300 feet, and a grate area of 1,128 square feet. There are 16,082 vertical tubes, and 744 horizontal tubes in all the boilers, also 7 furnaces in each one. Steam is to be used superheated in these engines, and there are four superheating boilers next the engines, having a heating surface of 2,848 feet. All the boilers are to be tested at a hydrostatic pressure of 65 pounds to the square inch. By an act of Congress, the working pressure of steam boilers may be three-fourths the tested pressure; these engines can, therefore, have, in round numbers, 50 pounds of boiler pressure per square inch applied to them, provided the boilers stand the test. It is hardly necessary to say that this enormous pressure has never yet been applied to engines of a similar size. The boilers and engines are all to be of the best materials, and the cylinders and valve faces as hard as tools can work them. All bolt-holes are to be rimmed, and the workmanship otherwise according to the most approved principles of modern engineering practice.

THE BRITISH IRON-CLAD FRIGATE BELLEROPHON.

The London *Times*, in describing the progress which the British Admiralty is making towards the construction of a fleet of iron-clads, gives the following description of the frigate *Bellerophon*, now being built at the works of Messrs. Penn.

"This vessel is in point of strength intended to be a monster among these monsters, to be in fact, as terrible an assailant to iron-clads as an iron-clad would be to wooden ships. The object with which this vessel is designed is, in case of another great naval war, to avoid a repetition of the long dreary work of blockading an enemy's fleet by wearisome and dangerous cruising off the mouth of harbors. The *Bellerophon* is to be a vessel of such strength and speed and tremendous weight of guns as, in case of an enemy's iron fleet running into port, she can follow them with impunity, and at long range fight them at their moorings, till she either drives them ashore or forces them out to sea. Specially built for the discharge of such duties, it is almost needless to say how carefully every point in her equipment has been considered; and as Mr. Penn undertakes that her speed shall equal her strength, there seems to be very little doubt but that, with her impenetrable sides and her armament of ten 300-pounders and two 600-pounders, she will be the most formidable sea-going frigate the world has yet seen. The length of this vessel is to be 300 feet, and her breath 50 feet; her tunnage will be 4,246 tuns, her displacement 7,053 tuns; and though carrying the heaviest armor and armament ever sent afloat, her draft will be only 21 feet forward and 26 feet aft—less than the draft of ordinary two-deckers. The height of her lowest portsill from the water will be 9½ feet, the distance between the guns 15 feet, and the height between decks 7 feet. Her midship section is smaller than that of the *Warrior*, and to that extent, therefore, she will be easier to steam and sail. She is to have four masts—only the first square-rigged, the three others carrying immense fore-and-aft sails, a rig from which the French have got such admirable results with their iron frigates under canvas. In the engines of the *Bellerophon* it is hoped to effect a great improvement as regards the consumption of coal. The *Black Prince*, which is now the fastest ocean steamer afloat, burns at the rate of 4½ pounds of coal per indicated horse-power per hour, and on her trial trip, with her screw going 54 revolutions, she did 15½ knots an hour, and can be depended on, at sea, to average as high as 13. In the *Bellerophon*, however, it is hoped, by working with superheated steam, condensation and expansion, to reduce the consumption of coal to 2¼ pounds per indicated horse-power per hour. If this great result be effected, she will carry 16 days fuel, instead of nine; and if, as is expected, Mr. Penn can get 65 or more revolutions out of her engines, she can be depended on at sea to average 15 knots, or nearly 18 miles an hour.

"The ribs and framing of the *Bellerophon* will be much the same as those of other iron frigates, with the exception that the stringer plates and diagonal bracings will all be of steel—that is to say, of less than half the weight, and more than four times the strength, of the present system of wrought-iron fastenings. Wherever steel can be used with advantage, in point of strength and lightness, it will be adopted in the frame of this new frigate and Mr. Reed estimates that by this method, and while making the hull infinitely stronger, he will save in weight two or three hundred tuns, which can be infinitely better bestowed in increasing the thickness of the armor plating. It is the first time that steel has ever been used in these vessels, and Mr. Reed deserves every credit for adopting it, though it was not difficult to foresee that it must soon have been extensively used.

"The armor of the *Bellerophon* is to be no less than 16 inches thick, and this is to rest on 10 inches of solid teak beams. This outer protection is quite formidable enough, but what it protects is of its kind quite as strong in proportion. The inner skin consists of two plates, each of ¾-inch thickness, with a stout layer of painted canvas between to deaden concussion. Outside the skin come single-iron stringers of the tough steel. These angle-iron stringers in any metal would be of immense strength, and project from the inner skin 9½ inches and 10 inches alternately. Thus they form so many longitudinal shelves, of the depth mentioned, which run from stem to stern of the ship, two under each row of plates, and in these the teak beams are laid, the longitudinal layers of the angle-irons keeping the beams up to their work and preventing their lateral splintering, while they also support the plates with their edges and prevent their bending in unfairly on the teak. The *Bellerophon* is not thus coated from end to end and over all with this tremendous armor. In the centre and for 90 feet of her broadside she is thus protected, from 5 feet below the water line to the level of the upper deck. In this space are her guns, five 300-pounders, with one 600-pounder at each side. For the rest of her length there is only a belt of this massive armor, which goes to the same depth beneath the sea to six feet above it, so that she cannot be hit in any part where the water could enter."

[We have no broadside iron-clads building in this country that can compare with this frigate.—EDS.

HOW TO DISCOVER SMALL-POX.—*The Eclectic Journal* says concerning this matter:—"Now we offer this secret to the profession—as soon as the eruptions appear, and by pressure with the point of the finger may distinctly be felt the *small, hard substance, precisely as if a small, fine shot* had been placed under the cuticle of the skin. This peculiar appearance belongs to no other eruptive disease. We have applied the term *secret*, here; for whilst it is, and has been known to a few physicians, it is not mentioned in any of the standard authorities; nor does the writer claim the credit of the discovery. After this all works upon practice will add this unfailing diagnostic symptom."

NEW GREEN COLORS.—At the recent annual meeting of the Academy of Sciences, in France, a prize of two thousand five hundred francs ($500) was awarded to M. Guignet for the preparation of a non-injurious green for printing on tissues, and another of one thousand five hundred francs($300) to M. Bouffe for having discovered a substitute for an arsenical green in the manufacture of artificial flowers.

RECENT AMERICAN PATENTS.

The following are some of the most important improvements for which Letters Patent were issued from the United States Patent Office last week; the claims may be found in the official list:—

Device for amalgamating Gold and Silver.—This invention relates to a method of amalgamating gold and silver with quicksilver. It is well known that a strong affinity exists between quicksilver and the precious metals above mentioned; but chemical affinities take place at insensible distances; that is, upon contact of the two or more substances proposed to be united. To amalgamate gold or silver with quicksilver, therefore, in a manner so thorough as to extract all of those precious metals from the quartz or other earthy and mineral substances with which they are materially combined or mixed, it is necessary that every particle of the said precious metals should be brought into actual contact with an equivalent portion of the quicksilver employed for this purpose. This absolutely necessary condition of perfect amalgamation, it is believed, has never hitherto been effected; and hence it is that the said metals have never been fully extracted from the earthy and mineral combinations with which they are found in nature. This invention consists in pulverizing the quartz or metalliferous substances to an impalpable powder, and exposing this dust, either in a calcined or otherwise prepared condition, as it may be necessary sometimes to do, in order to isolate the said metallic particles from their sulphurous or other foreign combinations; or in an uncalcined state, as it may at other times be best to do, when unmixed with foreign bodies which hinder contact with the quicksilver, in a dry, sifted and finely-divided state, in a falling, moving or floating condition, in a close chamber or passage-way, to the hot vapor of distilled quicksilver, by which the two substances, namely, the hot vapor of distilled quicksilver and the pulverized quartz aforesaid, shall mingle together and interpenetrate each other, that every particle of the said precious metals contained in the said pulverized quartz must come into actual and direct contact with the finely divided particles of the quicksilver-vapor and effect a perfect amalgamation. Henry W. Adams, of New York city, and W. S. Worthington, of Newtown, N. Y., are the inventors of this device.

Firebox for Stoves and Furnaces.—The object of this invention is to facilitate the burning of fine coal in stoves and furnaces. The improvement relates to a novel construction of the fire-grate, whereby a large grate surface is obtained and a great circulation of air allowed through the fuel, thereby insuring a more perfect combustion of the fuel. The invention consists in constructing the fire-grate in horizontal and vertical sections so as to form horizontal, elevated and low portions connected by vertical portions, and using in connection with the grate, thus constructed, a series of perforated air-tubes or vent-ducts, whereby a perfect combustion of the fuel is obtained. William Bickel, of Pottsville, Pa., is the inventor of this improvement.

Steam Engine.—In all reciprocating steam engines heretofore constructed the movement of the piston has produced a concussion or shaking of the bed or foundation upon which the engine has been supported, and a tendency to tear the engine away from said bed or foundation, in many cases to the great detriment of the structure in which the engine is contained. This action has been especially injurious in the case of horizontal engines arranged transversely to the keels of vessels for driving screw propellers, and has been the great obstacle to the running of such engines at sufficiently high speeds to drive the propeller without the intervention of gearing or its equivalent between the crank shaft and propeller shaft. In such engines the weight of the piston and its attached piston rods and cross-head is frequently many thousand pounds, and the inertia of this mass, in the starting of the piston, re-acts against one end of the cylinder and tends to move the cylinder and bed of the engine toward one side of the vessel, and the force required to arrest the piston as it completes its stroke, after having acquired a great momentum, re-acts upon the framing and bed of the engine in the opposite direction to the re-action first mentioned, and tends to move the bed of the engine toward the other side of the vessel. In this way two distinct concus-

© 1864 SCIENTIFIC AMERICAN, INC.

sions are produced upon the vessel in a lateral direction during every stroke of the engine or in every stroke of each piston when more than one engine or an engine with more than one cylinder is used. The object of this invention is to counteract the above-mentioned effect or tendency of the movements of the piston of an engine; and to this end it consists in the connection with such piston, of a weight which has a corresponding reciprocating motion, but always moves in an opposite direction to the piston, such weight being equal or nearly equal to the weight of the piston and its rod or rods and their connections with the crank, and moving the same distance or being heavier and moving a correspondingly less distance, or lighter and moving a correspondingly greater distance. John Ericsson, of New York city, is the inventor of this improvement.

Time-piece.—This invention consists in the employment, in place of the ordinary hands of a clock or watch, of dials containing the names of different localities, arranged in such relative position toward each other that, by the motion of the disk-shaped hands or hand-disks on the dial of the clock or watch the local times of all the places marked on the disks can be observed at any moment; also in the application of two or more sets of hands marked with the names of different localities and moving on one and the same arbor, in combination with the dial of a clock or watch, in such a manner that the local time of each of the places marked on the hands, and the difference of time between said places can be observed at a glance whenever desired. Finally, in the arrangement of adjustable indices or local hands inserted into or attached to the edges of the hand-disks in such a manner that the same indicate the local time of that place where the watch or clock is to be used. A. W. Hall, of Chicago, Ill., is the inventor of this improvement.

CATTLE VALUATION.—According to published statistics, it appears that the wholesale cost of live animals brought to New York for slaughter last year, exceeded $30,000,000, and that more than half our beef comes from the single State of Illinois.

TO OUR READERS.

PATENT CLAIMS.—Persons desiring the claim of any invention which has been patented within thirty years, can obtain a copy by addressing a note to this office, stating the name of the patentee and date of patent, when known, and enclosing $1 as fee for copying. We can also furnish a sketch of any patented machine issued since 1833, to accompany the claim, on receipt of $2. Address MUNN & CO., Patent Solicitors, No. 37 Park Row, New York.

INVARIABLE RULE.—It is an established rule of this office to stop sending the paper when the time for which it was pre-paid has expired.

MODELS are required to accompany applications for Patents under the new law, the same as formerly, except on design patents, when two good drawings are all that are required to accompany the petition, specification and oath, except the Government fee.

RECEIPTS.—When money is paid at the office for subscriptions, a receipt for it will always be given; but when subscribers remit their money by mail, they may consider the arrival of the first paper a *bona-fide* acknowledgement of our reception of their funds.

Binding the "Scientific American."

It is important that all works of reference should be well bound. The SCIENTIFIC AMERICAN being the only publication in the country which records the doings of the United States Patent Office, it is preserved by a large class of its patrons, lawyers and others, for reference. Some complaints have been made that our past mode of binding in cloth is not serviceable, and a wish has been expressed that we would adopt the style of binding used on the old series, *i. e.*, heavy board sides covered with marble paper, and morocco backs and corners.

Believing that the latter style of binding will better please a large portion of our readers, we commenced on the expiration of Volume VII., to bind the sheets sent to us for the purpose in heavy board sides, covered with marble paper and leather backs and corners.

The price of binding in the above style is 75 cents. We shall be unable hereafter to furnish covers to the trade, but will be happy to receive orders for binding at the publication office. No. 37 Park Row, New York.

Back Numbers and Volumes of the "Scientific American."

VOLUMES I., III., IV., VII., VIII. AND IX.,(NEW SERIES) complete (bound) may be had at this office and from periodical dealers. Price, bound, $2 25 per volume, by mail, $3—which includes postage. Every mechanic, inventor or artisan in the United States should have a complete set of this publication for reference. Subscribers should not fail to preserve their numbers for binding VOLS. II., V. and VI. are out of print and cannot be supplied. We are unable to supply any of the first six numbers of the current volume. Therefore all new subscriptions will begin hereafter with the time the money is received.

ISSUED FROM THE UNITED STATES PATENT-OFFICE

FOR THE WEEK ENDING FEBRUARY 16, 1864.

Reported Officially for the Scientific American.

☞ Pamphlets containing the Patent Laws and full particulars of the mode of applying for Letters Patent, specifying size of model required and much other information useful to inventors, may be had gratis by addressing MUNN & CO., Publishers of the SCIENTIFIC AMERICAN, New York.

41,588.—Amalgamating and collecting Gold and Silver.—Henry W. Adams, New York City, and W. S. Worthington, Newton, N. Y. Ante-dated Feb. 12, 1864:

We claim, first, The precipitating or discharging of the pulverized quartz in a shower into an atmosphere of hot vapor of quicksilver, substantially in the manner herein shown and described.

Second, The cylinder, C, provided with a screen, D, and arranged and operated as shown for the purpose specified.

Third, The stirrers, N, and pan, M, either or both; having a rotary motion in combination with the cylinder, B, rotary screen cylinder, C, and furnace or still, J, as and for the purpose specified.

Fourth, Operating the stirrers, N, or the pan, M, from the shaft, I, when said shaft is arranged as shown and provided with a wiper-wheel, H, to operate the screen cylinder, C.

Fifth, The means employed for preventing the escape of the vapor of quicksilver from the cylinder, B, to-wit: the annular water chamber, a, into which the lower end of the screen cylinder, C, is fitted and the funnel, L, at the lower end of the cylinder, B, extending into the pan, M, and below the surface of the water contained therein, substantially as set forth.

41,589.—Stuffing for Mattresses, &c.—Henry A. Alden, Matteawan, N. Y.:

I claim as a new manufacture the production of mattresses, chair-seatings and other articles of furniture, bedding, &c., in which the stuffing is composed of sponge prepared in the manner substantially as herein set forth.

41,590.—Metallic Cartridge.—Enos G. Allen, Boston, Mass.:

I claim forming a metallic flanged cartridge case, imperforate and charged with the fulminate at its flanged end, and at its outer end swayed over the equator of the ball or head cap, so as to hold it close, and tapering so as to give certainty to the entry of this end into the barrel without obstruction, and secure a close fit to the chamber to prevent the escape of the gases therein; the said cartridge case containing buck, or other shot in its anterior portion, and powder in its posterior, the two to be separated by a wad of sufficient capacity and fitting with sufficient accuracy to prevent the escape of the explosive gas amongst the shot; all arranged precisely and specifically as described in the specification and drawing.

41,591.—Feed-water Heater for Locomotives.—Samuel F. Allen, Chicago, Ill.:

I claim the combination of the compound pipes, R, the exhaust pipes, T, the regulating valve, A2, the deflecting tongues, e, the yokes, X, and the heater, g, substantially as herein set forth.

41,592.—Stove Pipe Thimble.—Thomas K. Anderson, Hornellsville, N. Y.:

I claim the tin or zinc cylinder, D, having a bright surface, and indented throughout its surface with protuberances in the manner as and for the purposes herein described.

41,593.—Harvester.—Samuel Augsburger, Trenton, Ohio:

I claim a detachable elevating device for lodged or tangled grain, mounted rigidly upon and supported by the fingers, C, and consisting of a horizontal arm, D, and inclined arm, F, occupying the same vertical plane, the latter being attached by its intermediate part to the front of the horizontal arm, D, and projecting in front, below and beyond the same, all as herein shown and described and for the purposes specified.

41,594.—Iron Bridge.—James J. Beard, Columbus, Ohio:

I claim the arrangement and combination of the segments, A A, having bosses, a a a, on both sides with which to connect the bolts, c c, and the pillars, d d, for securing the beams or string-pieces, D D, and supporting the structure in the manner as and for the purposes specified.

41,595.—Wagon Brake.—Erasmus Bennett, Clarksville, N. Y.:

I claim the sliding hounds and pole, when used in connection with the arms, M N, and rods, Q R, connected with the rubbers, T U, and eye, bolt, or pin, Z, all arranged and combined as set forth and for the purposes specified.

41,596.—Stove.—Wm. Bickel, Pottsville, Pa.:

I claim, first, A barred or perforated grate consisting of upper horizontal plates, a a a, vertical plates, b b b, lower horizontal plates, c c, sliding in and out through apertures, c', all as herein shown and described and for the purposes specified.

Second, I claim the pipes, C C C, extending completely through the fire above the grate, B, open at both ends, and provided with a series of apertures, a*, to provide a more free and full supply of air to the fuel when used in combination with registers to open or close either end of all the pipes, simultaneously as explained.

41,597.—Handle for Stamps.—Matthew C. Borgia, Philadelphia, Pa.:

I claim the gum-elastic tube or block, B, fitted to the die as set forth when the said tube or block is of such a size and shape as to form the entire handle of the stamp for the purpose specified.

41,598.—Draught Regulator for Stoves and Furnaces.—John Briggs, Roxbury, Mass.:

I claim the improved draft regulator consisting of the expansion drum, F, its lever, H, the valve, M, and the adjustable stop, I, and spring, e, the whole being applied to a furnace or heating apparatus, and constructed in manner and so as to operate substantially as described.

41,599.—Gas Regulator.—F. W. Brocksieper, Bridgeport, Conn.:

I claim the arrangement and application of the slotted adjusting screw, A, or its equivalent to the aperture in the valve, D, or in the valve seat along side of the same, in the manner and for the purpose substantially as herein set forth and described.

41,600.—Hames.—Robert D. Brown, Covington, Ind.:

I claim the cap, C, provided with the screw, D, in combination with the bow, A, provided with the plate, E, substantially as described.

41,601.—Neck Yoke.—Stillman P. Campbell, Rochester, Minn.:

I claim, first, The ferrule, C, provided with the projections, c c, in combination with a ring, D, provided with a cross-plate and breast-strap rings as at d, substantially as described.

Second, The martingale ring, e, in combination with the ring, D, and ferrule, c, substantially as described.

41,602.—Combination of a Wash-stand and Water-closet.—Wm. Campbell, Waterloo, Pa.:

I claim, first, A wash-stand constructed with a movable or sliding top, G, a seat, c, and chamber compartment, A, arranged substantially as described.

Second, So applying the movable top, G, to the body of the cabinet, that it can be made to serve as a support or desk for a person sitting in the seat, substantially as described.

Third, A combined convertible wash-stand and privy-chair, constructed substantially as described.

41,603.—Plow.—Orman Coe, Port Washington, Wis.:

I claim, first, The curved tined pulverizer, arranged and supported in rear of the plow beam, A, in a plane obliquely to the line of draught, in combination with the plate, b, which forms a wide channel in the ground to allow the tines to enter freely, substantially as and for the purposes described.

Second, Although I do not claim broadly a revolving pulverizer having teeth on its edge, I do claim such having flattened and curved teeth, substantially as shown and described.

Third, Arranging in rear of the colter standard of a subsoil plow, the revolving curved toothed pulverizer, substantially as described.

41,604.—Dumping Cart or Wagon.—Isaiah B. Conklin, Pemberton, N. J.:

I claim the bar, F, pivoted to the shafts, C, and controlled by springs, f', and staples, G, when used in combination with the hooks, H H, rigidly attached to the cart body, A, all as herein shown and described and for the purposes specified.

41,605.—Pocket Calendar.—D. E. Crosby, Brooklyn, N. Y.:

I claim the employment or use of a spring, c, or its equivalent in combination with the dial, B, and disk, A, as and for the purposes specified.

[The object of this invention is to produce a perpetual calender which can be conveniently carried in the pocket and which, when once set, is not liable to shift spontaneously.]

41,606.—Soap-dish.—John Cundy, Philadelphia, Pa.:

I claim the wooden bowl, A, having an inclined ledge, d, and two compartments separated from each other by a movable or detachable perforated plate, B, of metal, all as set forth.

41,607.—Uterine Supporter.—D. M. Dake & S. L. Hockert, Pittsburgh, Pa.:

We claim the arrangement of the curved wires, A A, passing through vertical holes in the front brace, B, and held in position by means of set screws, P P, when used in combination with the inquinal or pubic pads, N N, having a lateral or adjusting motion in the long slots, n n, and with the central hole, L, and tightening screw, m, for holding different instruments in the manner and for the purposes herein set forth

41,608.—Bottle-filling Machine.—Wm. F. Davidson, Cincinnati, Ohio:

I claim, first, The provision of the valve guarded inlet, K L, and flexible or other suction pipe, M, in the described combination with a bottle-filling syringe, substantially as set forth.

Second, The provision of a stopper or valve, C, at the vent age of a bottle-filling syringe said valve being made to close and open automatically, in conjunction with the action of the piston, substantially as set forth.

41,609.—Grain-cleaner.—Wm. S. Deisher, Hamburgh, Pa.:

I claim the employment of the scattering teeth, i i i i, within the blast spout and at the edge of the curk opening, g, in the manner and for the purpose herein shown and described.

I also claim the employment of the adjustable angular guiding slides, G, when arranged to operate in conjunction with the blast spout, F, and tubes, I, in the manner herein shown and described.

I also claim the combination of the circular double-acting valve, L, with the discharge spouts, k k', all arranged in the manner herein shown and described; so that the fan may be rotated in either direction and so that the blast of air through the spout, F, may be always readily controlled, as set forth.

[This invention consists in a novel dress for the stones as hereinafter described, whereby the grain is acted upon in a more thorough manner than hitherto, and more perfectly cleaned and scoured. The invention also consists in a novel and improved grain separating device and fan attachment, whereby it is believed that several advantages are obtained over the ordinary means employed for that purpose.]

41,610.—Tool for making Buckles.—Robert Durning, Lawrenceville, Pa.:

I claim the employment or use, in the manufacture of harness and other similar buckles, of a series of tools constructed substantially as shown, for the purpose of opening the eyes of the tongues of the buckles, and closing the same in the buckles and for forming the tubular friction rollers and also adjusting them on the buckles as herein set forth.

[This invention relates to an improvement in the manner or process of manufacturing buckles, such as are made with wrought-iron tongues and provided with friction rollers and are employed for harnesses and for similar purposes. The invention consists in the employment or use of certain means or tools which may be used separately, by hand or so arranged as to be operated by mechanical means with any suitable power, and so constructed as to respectively open the eye of the tongue and close the same on the bar of the buckle, to form the tubular friction roller, and to adjust the same on the roller bar of the buckle, whereby buckles of the class specified may be manufactured much cheaper than at present, and in a superior manner.]

41,611.—Operating Ordnance.—James B. Eads, St. Louis, Mo.:

I claim, first, The raising or lowering of the gun slides or frame on which the gun carriage moves in a line so as to keep the axis of the gun in a line parallel therewith, and in such manner that the breech and trunnions of the gun are moved up or down whilst the muzzle of the gun is kept at nearly a fixed point, for the purpose of giving the necessary vertical range or aim of the gun, and thus obviating the use of a port-hole larger than the muzzle of the gun, substantially as described.

Second, I also claim the pivoting of the platform, A, that carries the gun or guns, and the mechanism for operating it or them, on a hollow pin or pivot, for the purpose of admitting, or of admitting and discharging the steam, air, water, or other element for operating the mechanism that raises or lowers, or moves the gun to or from the port, substantially as described.

41,612.—Steam Engine.—John Ericsson, New York City:

I claim the employment of a reciprocating weight so connected with the piston of a steam or other engine as to move always in the opposite direction to the motion of the piston, and so proportioned as to operate substantially as herein specified.

41,613.—Horse Rake.—Levi W. Fredrick, Ray, Ind.:

I claim the thills constructed of the parts, D D F F, arranged as shown, when used in combination with and applied to the revolving rake, substantially as herein described.

[This invention relates to certain improvements in what are generally known as revolving horse-rakes. The invention consists in mounting the rake on wheels and arranging it in such a manner that it may be manipulated by the driver or attendant with the greatest facility, in order to discharge the load and also to enable the rake to pass over obstructions which may be in its path. The invention further consists in a novel construction and arrangement of the thills, whereby the revolving movement of the rake in discharging its load is greatly facilitated, the implement preserved from much wear and tear, and the labor of the horse materially diminished.]

41,614.—Cultivator.—Wilkenson Furnas, Ononwa, Iowa:

I claim the arrangement of the treadles, I I, frame, b, beams, D, and guards, G, with the frame, A, levers, H, and serrated bars, m, all constructed and operating together in the manner herein shown and described.

[This invention relates to those parts which serve to adjust the plows to the width of different rows, to give to them a lateral motion

© 1864 SCIENTIFIC AMERICAN, INC.

while in operation, and to throw them out of the ground while turning or passing an obstruction.]

41,615.—Hand Grenades.—George P. Ganster & Isaac S. Schuyler, New York City:

I claim the combination of the chamber, A B, cap, C, plug, b, frangible fuze, D, and balls, E, all constructed, arranged and operating in manner as and for the purpose set forth.

41,616.—Railroad Journal Box.—Warner Groat, Green Island. N. Y.:

I claim, first, The packing composed of the wooden strips, C C′, covered at their inner side with leather, a*, or other suitable material and fitted together as shown or in an equivalent way within a chamber, a, at the rear of the box, A, and secured by a wooden key, D, substantially as herein set forth.

Second, The wooden plate or door, G, fitted within the inclined front end of the box, A, as and for the purpose specified.

Third. The metal plate, H, fitted to the front end of the box, A, in combination with the wooden plate or door, G, arranged substantially as and for the purpose set forth.

[This invention relates first, to a new and improved packing, constructed, arranged, and applied in such a manner as to effectually retain the oil or other lubricating material in the box and at the same time be capable of being adjusted snugly to the axle as the bearing wears, and also capable of being removed in part for the insertion of a new bearing when necessary, and capable of lifting up and sustaining the wheel and axle where a car is raised and adjusted on the track and also possess the advantage of admitting of being removed when worn out, checked or rendered defective from other causes, and a new packing inserted in its place without removing the trucks from the car body, raising the car or manipulating the latter in any way whatever. Second, to an improved removable plate or door at the front end of the box, constructed and arranged in such a manner that it may be adjusted in position and removed with the greatest facility for the insertion of the lubricating material and the removal of the bearing, and at the same time, when adjusted in position, be firmly retained oil-tight in its proper place.]

41,617.—Time-piece.—Alexander W. Hall, New York City:

I claim, first, The employment or use of disks, B C, in place of the ordinary hour and minute hands of a clock or watch either one or both combined, said disks being marked with radial lines, c d, and with the names of different localities or places, substantially as herein shown and described, so that by the motion of said disk or disks on the dial of the time-piece, the local time and also the difference of time for the different localities can be determined.

Second, The use of two or more sets of hands, c d, marked with the names of different localities and moving on one and the same central arbor, a, of a time-piece, A, in the manner and for the purposes substantially as set forth.

Third, The adjustable indexes or local hands, D E, in combination with the hour and minute disks, B C, of the time-piece, A, constructed and operating in the manner and for the purpose substantially as specified.

41,618.—Vessel for cooking by Steam.—Lydia S. Hall, Washington, D. C.:

I claim, first, The caster steamer in combination with the boiler, constructed and operating substantially as described.

Second, I claim also the double steamer in combination with the caster steamer, constructed and operating as above described.

Third, I claim likewise the combination of the double steamer, the caster ste mer and the boiler, constructed and operating as above described.

41,619.—Steam Radiator.—Austin S. Hart, Buffalo, N. Y.:

I claim the cast pipes, C, having a projection, C′, near each end and on opposite sides, each alternate projection being "stopped off," or made solid; so that when the pipes are laid up in a stack there will be a good joint connection formed at these projections, and a continuous current of water or steam caused to flow from the boiler through each tier of pipes, for the purposes and substantially as described.

41,620.—Liquid Measure.—Alonzo Hicks, Flushing, N. Y.:

I claim the twisted rod, d, and float, e, fitted as specified in combination with a dial or index and vessel to contain the fluid to be measured, as set forth.

41,621.—Safe.—George Hopson, Bridgeport, Conn.:

I claim the compound burglar-proof construction, composed of annular rings or plates of hard material alternating with soft material and welded or soldered together, substantially in the manner and for the purpose herein set forth.

41,622.—Stump Machine.—John F. Hostetter, Penn Township, Pa.:

I claim the arrangement of the gearing, C D X E F and K, in combination with the block, A, and long screw-shaft, H, with its claws, h, constructed and used in the manner set forth for the purpose specified.

41,623.—Washing Machine.—Charles H. Hudson, Ogdensburg, N. Y.:

I claim the swinging and yielding posts, C C, attached to a rock-shaft, B, connected with the wash-board, A, substantially as shown in combination with the box, F, provided with the rollers, G G, and elastic rubber, I, the box being attached to the posts, C C, and all arranged to operate as and for the purpose set forth.

[This invention is designed to supersede the hands in washing with the ordinary wash-board, and it consists in the employment or use of rollers and a rubber placed within a suitable box attached to a swinging frame connected to the wash-board in such a manner that the rollers and rubber may be moved over the wash-board, and the operation of washing clothes by hand greatly facilitated.]

41,624.—Door Weather-strip.—Wm H. Hurlbut & J. W. Sharp, Elgin, Ill.:

I claim the strip, C, in combination with the opening or passage, b, in the door-sill, B, and the slot, a, in the lower edge of the door, A, all arranged substantially as and for the purpose set forth.

[This invention relates to a new and improved weather-strip arrangement for preventing storms from beating underneath doors, and it consists in the employment or use of a semi-cylindrical rod or strip being on pivots nd fitted in the upper part of a water-passage in the sill and arranged n such a manner as to fit into a groove in the lower edge of the door when the latter is closed; all being arranged in such a manner as to effect the desired end.]

41,625.—Hay and Cotton Press.—Ira James, Mattoon, Ill.:

I claim, first, The provision in a vertically-acting beater hay-press of sleeve, P, ratchet and brake movements, W and W X, and pulley and toggle movements, Q S T, the whole being combined and operating substantially as set forth.

Second, The combination of the slotted bars, J J J J, cams, Z Z, catches, I 2, nd grooved battens, C c G c. all constructed, arranged and operating as herein shown nd described, to enable the removal of the bale for hooping or binding outside of the press in the manner set forth.

41,626.—Bier.—George W. LaBaw, Jersey City:

I claim, first, The frame, b, fitted as specified with the folding legs, c, and sliding handles, d, to form a bier, adapted to the hearse, or to being carried by hand as set forth.

Second, I claim the pulleys, i i, fitted as specified, with separate divisions for each rope, in combination with the cross-shaft, e, and gears, g and h, whereby all four ropes passing to the coffin will be let off or wound up with uniformity, as set forth.

Third, I claim the pins, m, introduced through the loops at the ends of the ropes, for disconnecting them as specified.

41,627.—Preparing Fiber from the Bamboo.—Philip Lichtenstadt, New York City:

I claim the process of separating and disintegrating the fiber contained in bamboo, by treating it with a solution of lime, nitrate of soda, and oxalic acid, and preparing the textile material for preparing the textile material for manufacturing purposes, substantially as described.

41,628.—Fire-escape.—Josiah Lohr, New York City:

I claim the combination of the revolving table, E, oscillating shaft, F, mast, G, and windlass, i, all constructed and operating in the manner and for the purpose substantially as herein shown and described.

[This invention consists in a mast or pole provided with suitable platforms and rigging and connected to an oscillating shaft which has its bearings in lugs rising from a revolving table or platform in combination with a truck supporting said revolving platform and with a suitable hoisting mechanism in such a manner that said mast can be turned down to a horizontal position and at right angles with the axles of the truck ready to be drawn through the streets of a city or town, or that it (the mast), can be raised to any desired angle and revolved with the platform in either direction, according to the hight or position of those parts of a building which may be on fire, or from which it may be desired to remove persons or articles.]

41,629.—Plates for constructing Burglar-proof Safes, &c.—Walter K. Marvin, New York City:

I claim, first, As a new composition of matter, iron or steel combined with emery, substantially in the manner and for the purposes set forth.

Second, I claim combining emery with malleable iron or steel by rolling process as set forth.

Third, The manufacture of plates or sheets of iron or steel by welding together two or more plates or sheets having emery interposed, substantially as herein set forth

Fourth, I claim the method of making iron or steel plates having an emery core, or emery confined in cells throughout the interior as described by forming the same of two or plates, either or all of which are corrugated, grooved or having depressions or recesses formed therein for containing and holding the emery during the welding and rolling operations, as set forth.

Fifth, I claim the manufacture of burglar proof-safes, prison bars, and other objects calculated to resist the action of cutting or piercing instruments of iron and steel, made in the manner herein before described.

41,630.—Mode of fastening Hose to Couplings.—Charles McBurney, Roxbury, Mass.:

I claim the within-described clamp with its nib, c, and hole, b, secured in place by one or more screws, d, substantially in the manner and for the purpose specified.

41,631.—Breech-loading Ordnance.—Richard Lansing Mills, Columbus, Ohio:

I claim, first, A breech-loading cannon constructed with a steel-lined opening passing completely through its breech, and provided with an oblong, round-cornered block, B, fitted to slide therein and operated by a yoke and lever, substantially as herein described.

Second, The yoke, C, constructed with hinged wings, c c′, serving the combined purposes of communicating motion to the block, indicating its correct position for firing and permitting its ready removal, all as hereinbefore explained.

Third, The wedge, F, applied and operated by the lever, S, in the manner described, for closing the joint between the breech-piece and the rear of the barrel.

Fourth, The combination of the screw, G, movable ball, G1, socket, G2, and jointed nut, I, all constructed and operating in the manner and for the purposes set forth.

Fifth, The recess, R, in the bushing, Q, employed in the manner and for the purpose set forth.

41,632.—Floating Bag.—George Mitchell, London, England:

I claim the jaws, B, when the same are provided with a recess, f, and secured to the mouth of the bag, A, by rivets, c, which do not extend to the ends of the jaws, in combination with the screw bolts. C, or their equivalents applied and operating as and for the purpose set forth.

[The object of this invention is to produce a bag for carrying letters or papers of value, or for the mails in general, which can be readily closed and which when closed will be perfectly water-tight and form a safe protection for its contents when it happens to drop in the water, or to be exposed to moisture or wet in any other manner.]

41,633.—Securing Railway Bars.—John O. Montignani, Albany, N. Y.:

I claim the combination of a double hooked head with a wood screw as described, for the purpose of securing railway bars to their wooden substructures or any analogous use.

41,634.—Photograph Camera.—Hiram C. & Chauncey L. Moore, Springfield, Mass.:

We claim, first, The combination of one or more lens tubes, F F, and rotary disk, G, when applied to and forming a part of a camera box, substantially in the manner and for the purpose herein set forth.

Second, The combination of the handle, H, stops, c c′, and disk, G, substantially as set forth whereby the operator has complete control over the movement of the lenses.

Third, One or more lens, F F′, rotating about an axis eccentric to the axis or axes of said tubes, in combination with the partitions, a a′ a″ a‴, when applied to and forming a part of a photographic camera, for the purpose substantially as herein set forth.

41,635.—Vapor Heater.—O. F. Morrill, Chelsea, Mass.:

I claim the flexible or elastic plate, l, and its concavo-convex disk, H, or the equivalent thereof, in combination with the pressure screw, m, or its equivalent and the valve, g, and its seat, f, the aerovapor burner, B, its conduit, D, or conduits, D D′, and the reservoir, C, thereof.

I also claim the arrangement of the valve, g, and its seat, f, and the flexible diaphragm, i, the concavo-convex disk, H, and the conduit, D, substantially as above described, so that the pressure of the fluid of the reservoir shall operate to open or aid in opening the valve or moving it away from its seat, the closing of the valve being effected by a screw, m, or its equivalent, arranged with respect to and so as to act on, or move the diaphragm, substantially as specified.

I also claim the application of the valve rod, h, to the plate, i, so as to enable the valve to be moved and access to be had to the valve seat through the plate, i, substantially in the manner and for the purposes as specified.

41,636.—Damper.—Sylvester Munson, of Joliet, Ill.:

I claim the damper or valve herein described and represented, composed of two plates, a a′, arranged in relation to each other so as to operate in the manner and for the purpose set forth.

51,637.—Tobacco-cutter.—W. H. Pease, Dayton, Ohio:

I claim, first, The combination of the belts, R and S, and platforms, V and W, composing a gradually-contracting throat for compressing and feeding the tobacco, constructed and operating substantially as herein described.

Second, The belts, R and S, when constructed as described, and in combination with a cutting device for cutting tobacco.

Third, The swinging frame, B, g, composed of bar, B, and plate, g, constructed and operating substantially as described and for the purpose set forth.

Fourth, The rock-shaft, B2, in combination with brake, d, sleeve, D2. and lever, s, for the purposes specified.

Fifth, The sliding journals, f′, wedges, s s, and shoulders, s2 s2, in combination with rollers, q and T, constructed and operating substantially as described.

41,638.—Ash Leach.—Samuel A. Porter, Prescott, Wis.:

I claim the manner in which the leach is suspended in a revolving condition, as herein described.

I claim, also, the hook and staples used to connect the leach with frame or upright post to prevent its revolving, as herein described.

The bearers or shafts with which the leach is suspended and the manner of applying at or near the center of gravity, as herein described, using for that purpose the aforesaid wood and iron or any other suitable material, substantially the same, and which will produce the intended effect.

41,639.—Water Elevator.—W. E. Pratt, Iowa City, Iowa:

I claim, first, The combination and arrangement of the movable roller or barrel, E, the bevel head, Q, the cylindrical portion, x, and the spring, T, with the ratchet wheel, S, the pawl, W, the shaft, D, the crank, I, and the lever, K, substantially as and for the purpose set forth.

Second, The combination and arrangement of the movable roller or barrel, E, the bevel head, Q, the cylindrical portion ,x, and the spring, T, with the rope, F, the flat chain, G, the bucket, H, the rods, M M, the valves, L L, and the conductors, P P, substantially as and for the purpose set forth.

41,640.—Apparatus for elevating Hay, &c.—G. W. Prout, Ashland, N. Y.:

I claim the tilting platform, G, applied in combination with a frame or box, F, and with a suitable hoisting rope and tackle, substantially in the manner and for the purpose shown and described.

[The object of this invention is to elevate a load of hay or any other load bodily from a wagon or car to a place above and dump it at the required spot in an easy, simple and quick manner.]

41,641.—Rake for Harvesters.—Adam R. Reese, Phillipsburgh, N. J.:

I claim, first, The combination of the yielding finger-beam, the raking mechanism, and the main or gearing frame, when the several parts are constructed and arranged and operate substantially in the manner described for the purposes specified.

Second, The combination of the bracket, H, upon the finger-beam, in which the raking mechanism is mounted, with the stop, S, upon the main frame, when arranged and operating substantially as described, for the purpose set forth.

Third, The combination of the rake-shaft, K, with the driving-shaft, O, by means of the endless chain, M, when arranged and operating substantially in the manner described, for the purpose of driving the rake in any position of its shaft without the intervention of gearing, as set forth.

Fourth, The combination of the spindle, K, ring, j, and cam ring, L, with the rake-arms, substantially as described, for the purpose set forth.

41,642.—Fibrous Material from Corn-stalks.—J. A. Roth, Philadelphia, Pa.:

I claim the solving and abstracting of the components of the stalks of Indian corn by the application of one or more water baths, in a boiling state, over two hundred and twelve degrees, Fah., as described.

Second, I claim the use of the chemical agent, after the water bath or the boiling of the material under treatment has been completed, in the manner and for the purpose as described.

Third, And I claim the combination of treatment or process of the fibers of the stalks of indian corn, as described, and also the neutralizing of substance still adhering to the fibers after being washed by the application of sulphuric acid, or its equivalent, in the manner and for the purpose specified.

41,643.—Gang Plow.—J. L. Runk, Nashville, Ill.:

I claim, first, The combination of the pulleys, p p, endless chain, i, and adjusting lever, G, with pivoted plow beams, D D′, attached to the tongue, C′, in front of the axletree, all operating substantially as described.

I claim, second, The manner herein described, of uniting the two parts of the axle and the hounds so that when the axle is extended in length or shortened, the hounds will be adjusted to operate therewith, as set forth.

Third, The laterally-adjustable pulley standard, E, in combination with the laterally-adjustable hounds, C, plow beams, D D′, and extensible axletree, B, substantially as described.

Fourth, The combination of the pivoted plow beams, D, extensible axletree, B, and laterally-adjustable hounds, C, in the manner and for the purpose specified.

Fifth, I claim the specified construction of standard boxes, N, so that they afford two bearings or supports, n n′, while made in one piece, N, and otherwise operate, with wedges or set-screws, for the purpose set forth.

41,644.—Gas Fixture.—Charles A. Shaw, Biddeford, Maine:

I claim an adjustable ring or rings, or an equivalent, in combination with the plug, A, and connector, B, substantially in the manner and for the purposes set forth and specified; and this I claim whether the said plug has a pin arranged in the manner described or not.

41,645.—Cooking Stove.—Joseph Sholl, Burlington, N. J.:

I claim the fire chamber, hot-air chamber, I, and oven, X, arranged as set forth, in combination with the system of flues herein described, whereby the top of the oven is heated by the products of combustion only, while the necessary heat is imparted to the front bottom and rear of the oven by the air heated in the chamber, I, as set forth for the purpose specified.

41,646.—Apparatus for grinding Cutter-bits for Rifling Machines.—Dwight Slate, Hartford, Conn.:

I claim the oil-stone slab, c, in combination with the sleeve. a, or their respective equivalents, constructed, arranged and operating substantially in the manner hereinbefore set forth.

41,647.—Manufacture of Sulphuric Acid.—John Smith and John R. Savage, Philadelphia, Pa.:

We claim, first, Concentrating sulphuric acid by subjecting it to the action of steam-heated worms in leaden pans, as described.

Second, Concentrating the acid to a greater density by introducing it to a still containing a steam-heated worm, as specified.

41,648.—Mode of manufacturing Wadding.—Isaac Stratton, Swanzey, N. H.:

I claim the mode of operation, herein described, of manufacturing a batting or wadding, the same consisting in the throwing the sizing in the form of a mist, simultaneously, upon the inner surfaces of two independent bats, and thus uniting these bats under pressure whilst in the moist state.

41,649.—Chimney Cap.—Alonzo L. Sweet, Norwich, Conn.:

I claim a chimney cap composed of a base. B, and pot, C, constructed of clay molded in the desired form and baked and glazed substantially as herein set forth.

[This invention consists in having the chimney cap constructed of baked clay, glazed, so as to present a hard surface impervious to air and moisture. The invention also consists in a novel construction and arrangnment of the cap, whereby the upper part or pot is separate from the base or lower part, and both rendered capable of being secured firmly in contact on the chimney, and either or both being used as desired.]

41,650.—Fastening of Mosquito Bars to Windows.—Asa F. Tarr, Rockport, Mass.:

I claim the combination and arrangement of the sash, d, with the frame, e, the net, f, the hooks, a, the bar, b, and plate, c, substantially as and for the purpose specified.

41,651.—Knuckle-joint for Shafting.—Simeon N. Taylor, Burnet, Wis.:

I claim the socket, A, provided with the internal longitudinal shoulders, a, in combination with the head, C, having the curved projections, c, on its periphery, all constructed and arranged substantially as and for the purpose herein set forth.

[This invention relates to a new and improved coupling for connecting together the tumbling rods of thrashing machines and the shafting of other machinery which require to be placed in an oblique position relatively with each other.]

41,652.—Army Plate.—William Terneson, Philadelphia, Pa.:

I claim the pan or plate, A, with its rim, a, and the strips, B and B′, when the latter are of such a length and are so hinged to each other and to the pan, that they can be folded down and occupy a space within the limits of the rim, a, as set forth for the purpose specified.

41,653.—Station Indicator.—F. J. Underwood, South Hardwick, Vt.:

I claim the rollers, B C C′, with springs, I I′, wheel, E, lever, F, and pawl, f, cord, G, and spring, H, all arranged and operating in combination with the case, A, in the manner and for the purpose substantially as specified.

[The object of this invention is an improvement in that class of indicators which are intended to be put up in railroad cars running on open roads or in the streets of a city, and which will enable the conductor or any other person having charge of the car, simply by pulling a cord to bring the name of the station which the car approaches or passes at any moment, before the eyes of the passengers.]

© 1864 SCIENTIFIC AMERICAN, INC.

41,654.—Marine Life-preserver.—Jean B. Verdier, Paris, France :

I claim the pads, A and B, containing buoyant material in combination with the cords, d d, adjustable strap, e, and neck band, g, the whole constructed and arranged for application to the body, as set forth.

41,655.—Percussion-cap Holder.—J. T. Warren, Stafford, N. Y.:

I claim the arrangement and combination of the case, A, with its devices, B C E L and N, and with the perforated traveling box, G, with its spiral rack, K, as incased in a leather pouch, and arranged, combined and operated as herein described.

41,656.—Flag.—Augustus Watson, Washington, D. C.:

I claim a metallic flag, constructed, ornamented, and to be used substantially as above set forth, as a new article of manufacture.

41,657.—Closing Fruit Cans.—William Webster, Middletown, Ohio :

I claim the spring-wedge rod, A, having one or more angles or curves, and operating in the manner and for the purpose substantially as described.

Also, the combination of the rod, A, with a traverse or strengthening bar upon the can cover, applied as described for the purpose specified.

41,658.—Apple-parer.—Jonathan White, Antrim, N. H. :

I claim the application and arrangement of the can in connection with the spur, g, or their substantial equivalents, for operating the arm, H, and paring knife, substantially as and for the purposes set forth.

I also claim the application of the bent lever, M, when acted upon by the plate, L, substantially as described, for moving the knife from the fruit, after it has been pared, and then again releasing the arm, H, and knife, f, so as to be brought in proper position to pare another fruit.

41,659.—Faucet.—C. T. Woodman, Boston, Mass.:

I claim, first, The employment of the loosely-fitting elastic globular body, F, in the pipe or tube, B, in combination with the seat, c, and follower, F, substantially as set forth and for the purpose described.

Second, The lateral outlet, G, in combination with the seat, c, elastic ball, F, and follower, E, substantially as and for the purpose described.

41,660.—Grain Separator.—Sanford Adams (assignor to Joel Nourse), Boston, Mass.:

I claim, first, The feeding hopper, g, constructed substantially in the manner described and for the purposes set forth.

Second, I claim the pivoted arms or levers, q q, in combination with the slide track, h, for the purposes described.

Third, I claim the separator, m, constructed and arranged substantially as set forth.

Fourth, I claim the receiver and conductor, j, in combination with the sieve, s, and the slat, n, for the purposes described.

41,661.—Grain-binder.—Jacob Behel, Earleville, Ill. :

I claim a turning cord-holder, constructed substantially as herein set forth, so as to seize the binding cord by turning on an axis.

I also claim the combination of a turning cord-holder with a turning belay wheel, substantially as set forth.

I also claim the combination of a cord-carrying arm and its appurtenances with a turning-cord holder, substantially as set forth.

I also claim the revolving tying bill, composed substantially as herein set forth, of jaws secured crosswise to a shaft, so that the cord to be tied is wound into a loop crosswise to the jaws.

I also claim the combination of a revolving tying bill, with mechanism to carry it to and fro in directions crosswise to its shaft, substantially as set forth.

I also claim the combination of a revolving tying bill with a slotted plate and a movable shield, the whole operating substantially as herein set forth.

I also claim the combination of a revolving tying bill and the mechanism for moving it to and fro crosswise to its shaft, with a detent, the whole operating substantially as set forth.

I also claim the combination of a reciprocating toothed rack with a pinion having an enlarged tooth, the two operating substantially as and for the purpose herein set forth.

I also claim the combination of a *swinging* frame, for moving the cord-tying bill to and fro, with a segmental rack that is eccentric thereto, the whole operating substantially as herein set forth.

I also claim the combination of a reciprocating cord-tying device with a stationary knife in such a manner that the cord is cut by being drawn across the edge of the knife by the movement of the cord-tying device, substantially as herein set forth.

41,662.—Ordnance.—T. A. Blakely, London, England Patented in England May 22, 1863 :

I claim the manufacture of cannon composed of two or more tubes having successively-decreasing amounts of extensibility within the extensible limit (the inner tube having the greatest amount) when these tubes are put together with initial tension, substantially in the manner and for the purpose described.

41,663.—Restoring De-ammoniated Guano.—Augustus A. Hayes (assignor to William T. Glidden), Boston, Mass. :

I claim the application to de-ammoniated guano of sulphuric acid and common salt, or the equivalents thereof, and the combination of the mixture with putrefactive animal matter, or its equivalent, productive of ammonia, the whole being substantially as hereinbefore described.

41,664.—Butt Hinge.—Robert Hoadley (assignor to himself and Henry A. Shipman), New Haven, Conn.:

I claim constructing and adjusting the stop, c, in the manner described, so that the butt may be opened or set at any required angle.

41,665.—Steam Boiler.—Joseph H. Springer (assignor to himself and Milton Foreman), Philadelphia, Pa.:

I claim the tubes, D, internal tubes, E, and air openings, i, when the said tubes are formed and arranged within the boiler, as and for the purpose described.

41,666.—Tanning.—Jeremiah Wonder, Trucksville, Pa., assignor to himself and Loring A. Robertson, Dunning, Pa.:

I claim the employment of the substances herein specified in connection with hemlock tan for the purposes and as specified.

41,667.—Machine for sawing Wood.—Jarvis Case, Lafayette, Ind.:

First, I claim the arrangement and combinatiod of the horizontal crank wheel, B, with the two pitmen, H and I, and swinging arm, K, attached to the rocking shaft for operating the cross-cut saw and allowing the horses to pass between the wheel, B, and the saw, substantially as set forth.

Second, I also claim the auxiliary saw guide, U, with its fingers, w, in combination with the fingers, m, substantially as described.

RE-ISSUES.

1,617.—Thrashing Machine.—David M. Cochran, Richmond, Ind. Patented Sept. 3, 1861 :

First, I claim the arrangement and combination of the endless belt or belts, g, provided with the triangular slats, h h, and spout, I, with partition, i, the whole constructed and operating substantially as and for the purpose set forth.

Second, I also claim the combination of the elevator, J, screw conveyer, H, and grain receiver, K, the latter being provided with the slide, L, and valve, M, which valve is connected through the medium of a lever, O, and pawl, P, with a ratchet or register, Q, all arranged for joint operation. as and for the purpose set forth.

Third, I claim the construction of the rear or tail end of the thrasher with a boxing, B, which constitutes side walls to the last section of the conveyor of the thrasher and also to the first section of the stacker, substantially as and for the purpose set forth.

Fourth, The combination of the supplemental box, E, box, B, hinges, b, hooks, a * *, and conveyors of the stacker and thrasher, substantially as and for the purpose set forth.

1,618.—Process of treating Fish-water for use in Dyeing, &c.—James B. Herreshoff, Bristol, R. I. Patented Dec. 15, 1863 :

I claim, first, The use of fish-water in the dye tub or as an agent for dyeing, substantially in the manner herein specified.

Second, The within-described process of treating or preparing fish-water previous to its application in the dye tub by exposing it to a temperature above 212° under a pressure higher than that of the atmosphere, substantially as set forth.

1,619.—Boot Strap.—F. H. Moore, Boston, Mass. Patented Jan. 5, 1864 :

I claim a strap for boots and shoes, constructed of metal or other suitable rings or tough material, attached either permanently to the boot top, or in such a manner as to admit, after the boot or shoe is drawn on the foot, of being turned or shoved down within or at the outer side of the boot top, substantially as herein set forth.

1,620.—Running Gear of Locomotives.—Thomas H. Neal, Pittsburgh, Pa. Patented June 30, 1863:

I claim, first, The combination of the wheels, q, flanges, n, and friction rollers, m, with the crank shafts, x, arranged and operating substantially as and in the manner herein described for the purpose set forth.

Second, The use of two parallel crank shafts connected by means of connecting rods, endless chains or belts, when used in combination with the running gear of locomotives, as herein described and for the purpose set forth.

1,621.—Stove.—Samuel B. Sexton, Baltimore, Md. Patented April 19, 1859. Re-issued Dec. 3, 1861 :

I claim a stove for warming purposes, constructe dwith a fuel supply magazine supported free from the grate, and a combustion chamber, having a base surface of greater diameter than the fuel magazine, substantially as and for the purpose set forth.

Second, In combination with the above, constructing the combustion chamber with projecting window or mica frames, substantially as described.

Third, A stove for warming purposes embracing the features of construction named in my first claim and the additional feature of the gas-circulating apartment above the fuel magazine, substantially as and for the purpose set forth.

Fourth, A stove for warming purposes wherein the flowing of the coals in a lateral direction from the lower end of the fuel magazine is wholly unobstructed, and at the same time the combustion chamber is formed by the outer wall of the stove, and the products of combustion circulate underneath, around, over, and in contact with the fuel magazine, whatever may be the form and relative proportions of the parts, substantially as and for the purpose set forth.

Fifth, The combination of a fuel magazine which has its lower end free from the grate, G, with a stove which has illumination doors or windows in its wall, A, so that the fire may be kindled through the apertures or door frames, substantially as set forth.

1,622.—Stove.—Samuel B. Sexton, Baltimore, Md. Patented April 19, 1859. Re-issued Dec. 3, 1861 :

I claim, first, The adaptation of a fire-place stove which has driving flues, for use with a fuel magazine which has an unobstructed space between its lower end and the grate, substantially as and for the purpose set forth.

Second, A fire-place stove which has diving flues constructed with the reduced portion, A′. enlarged portion, A, reverberating plate, A″, gas space, g, projecting window or door frames, i, and fuel-supply magazine, H, substantially as and for the purpose set forth.

Third, A fire-place stove with diving flues and kindling apertures, i i, in combination with a fuel-supply magazine which has a free unobstructed space below and out to the interior surface of the part, A, between itself and the grate, G, substantially as and for the purpose set forth.

Fourth, In combination with a fire-place stove which has diving flues, I claim a fuel-supply magazine which has a free unobstructed burning space below it and out to the wall of the stove, substantially as described.

Fifth, The combination of the fuel-supply magazine which is arranged to have a space between its lower end and the grate, G, with a fire-place stove which has a contracted part, A′, in which the gases circulate in contact with and over the cover of the fuel-supply magazine, and from which the gases pass into driving flues, and thence under or around the ash pan and up to the draught or exit flue, substantially as and for the purpose set forth.

Sixth, The chamber, A A′ A″, with door, I, in combination with the internally-located fuel-supply magazine, H, which is free from the grate and has a removable cover, substantially as and for the purpose set forth.

Seventh, A fire-place stove which combines in its construction a burning base surface, G, of larger diameter than the fuel magazine, a magazine, H, and diving flues, substantially as and for the purpose set forth.

Eighth, A cold-air chamber combined in any manner substantially as described, with a stove having the fuel-supply magazine, H, for the purpose set forth.

Ninth, The combination of the main chamber, A, fuel-supply magazine, H, flues, B B B′, and damper, b, substantially as and for the purpose set forth.

DESIGNS.

1,896.—Pack of Cards.—Servetus Longley, Cincinnati, Ohio.

1,897.—Labeling Barrels.—Wm. B. Maddux, Cincinnati, Ohio.

1,898 to 1,901.—Carpet Patterns (four cases).—Elemir J. Ney (assignor to the Lowell Manufacturing Company), Lowell, Mass.

1,902.—Sewing Machine.—Charles A. Shaw and James R. Clark, Biddeford, Maine.

EXTENSIONS.

Smut Machine.—Leonard Smith, Troy, N. Y. Dated Feb. 12, 1850 :

First, I claim the grates, B B, in the top of the machine in combination with the scrolls or spiral chambers, A A, and spouts, C C, for discharging smut and other light materials carried up by the blast, as set forth.

Second, I claim the chamber, I, at the bottom of the cylinder which concentrates and gives free discharge to all foreign matter to be separated from the grain by the blast in the last stage of operation of the machine, in the manner described and represented.

Third, I claim, in combination with the concave bottom which gathers the grain for its discharge from the machine, the distributors, J J, fig. 6, which give direction in the discharge of the grain separated from the foreign matter by the blast.

Fourth, I claim the draft floats, h h h h, fig. 5, in combination with the scouring surfaces, f f, for cleaning buckwheat, as set forth.

Raising and lowering Carriage Tops.—Solomon Goddard and Henry Warfield, Truxton, N. Y. Dated Feb. 19, 1850 :

I claim connecting the jointed-braces upon opposite sides of carriage tops, by means of a shaft, A, or rod passing back of the seat, in such a manner that the braces may be worked simultaneously upon both sides, substantially as herein described.

PATENTS

GRANTED

FOR SEVENTEEN YEARS!

MUNN & COMPANY,

In connection with the publication of the SCIENTIFIC AMERICAN, have acted as Solicitors and Attorneys for procuring "Letters Patent" for *new inventions* in the United States and in all foreign countries during the past *seventeen years*. Statistics show that nearly ONE-THIRD of all the applications made for patents in the United States are solicited through this office; while nearly THREE-FOURTHS of all the patents taken in foreign countries are procured through the same source. It is almost needless to add that, after *seventeen years'* experience in preparing specifications and drawings for the United States Patent Office, the proprietors of the SCIENTIFIC AMERICAN are perfectly conversant with the preparation of applications in the best manner, and the transaction of all business before the Patent Office; but they take pleasure in presenting the annexed testimonials from the three last ex-Commissioners of Patents :—

MESSRS. MUNN & CO.:—I take pleasure in stating that, while I held the office of Commissioner of Patents, MORE THAN ONE-FOURTH OF ALL THE BUSINESS OF THE OFFICE CAME THROUGH YOUR HANDS. I have no doubt that the public confidence thus indicated has been fully deserved, as I have always observed, in all your intercourse with the office, a marked degree of promptness, skill, and fidelity to the interests of your employers. Yours very truly,

CHAS. MASON.

Judge Mason was succeeded by that eminent patriot and statesman, Hon. Joseph Holt, whose administration of the Patent Office was so distinguished that, upon the death of Gov. Brown, he was appointed to the office of Postmaster-General of the United States. Soon after entering upon his new duties, in March, 1859, he addressed to us the following very gratifying letter:

MESSRS. MUNN & CO.:—It affords me much pleasure to bear testimony to the able and efficient manner in which you discharged your duties as Solicitors of Patents, while I had the honor of holding the office of Commissioner. Your business was very large, and you sustained (and I doubt not justly deserved) the reputation of energy, marked ability, and uncompromising fidelity in performing your professional engagements.

Very respectfully, your obedient servant,

J. HOLT.

Hon. Wm. D. Bishop, late Member of Congress from Connecticut, succeeded Mr. Holt as Commissioner of Patents. Upon resigning the office he wrote to us as follows:

MESSRS. MUNN & CO.:—It gives me much pleasure to say that, during the time of my holding the office of Commissioner of Patents, a very large proportion of the business of inventors before the Patent Office was transacted through your agency; and that I have ever found you faithful and devoted to the interests of your clients, as well as eminently qualified to perform the duties of Patent Attorneys with skill and accuracy. Very respectfully, your obedient servant,

WM. D. BISHOP.

THE EXAMINATION OF INVENTIONS.

Persons having conceived an idea which they think may be patentable, are advised to make a sketch or model of their invention, and submit it to us, with a full description, for advice. The points of novelty are carefully examined, and a written reply, corresponding with the facts, is promptly sent, free of charge. Address MUNN & CO., No. 37 Park Row, New York.

As an evidence of the confidence reposed in their Agency by inventors throughout the country, Messrs. MUNN & CO. would state that they have acted as agents for more than TWENTY THOUSAND inventors! In fact, the publishers of this paper have become identified with the whole brotherhood of inventors and patentees, at home and abroad. Thousands of inventors for whom they have taken out patnts have addressed to them most flattering testimonials for the services rendered them; and the wealth which has inured to the individuals whose patents were secured through this office, and afterwards illustrated in the SCIENTIFIC AMERICAN, would amount to many millions of dollars! Messrs. MUNN & CO. would state that they never had a more efficient corps of Draughtsmen and Specification Writers than those employed at present in their extensive offices, and that they are prepared to attend to patent business of all kinds in the quickest time and on the most liberal terms.

PRELIMINARY EXAMINATIONS AT THE PATENT OFFICE.

The service which Messrs. MUNN & CO. render gratuitously upon examining an invention does not extend to a search at the Patent Office, to see if a like invention has been presented there; but is an opinion based upon what knowledge they may acquire of a similar invention from the records in their Home Office. But for a fee of $5, accompanied with a model, or drawing and description, they have a special search made at the United States Patent Office, and a report setting forth the prospects of obtaining a patent, &c., made up and mailed to the inventor, with a pamphlet, giving instructions for further proceedings. These preliminary examinations are made through the Branch Office of Messrs. MUNN & CO., corner of F. and Seventh streets, Washington, by experienced and competent persons. Many thousands of such examinations have been made through this office, and it is a very wise course for every inventor to pursue. Address MUNN & CO., No. 37 Park Row, New York.

HOW TO MAKE AN APPLICATION FOR A PATENT.

Every applicant for a patent must furnish a model of his invention if susceptible of one; or, if the invention is a chemical production, he must furnish samples of the ingredients of which his composition consists, for the Patent Office. These should be securely packed, the inventor's name marked on them, and sent, with the Government fees, by express. The express charge should be pre-paid. Small models from a distance can often be sent cheaper by mail. The safest way to remit money is by a draft on New York, payable to the order of Messrs. MUNN & CO. Persons who live in remote parts of the country can usually purchase drafts from their merchants on their New York correspondents; but, if not convenient to do so, there is but little risk in sending bank bills by mail, having the letter registered by the postmaster. Address MUNN & CO., No. 37 Park Row, New York.

Patents are now granted for SEVENTEEN years, and the Government fee required on filing an application for a patent is $15. Other changes in the fees are also made as follows :—

On filing each Caveat	$10
On filing each application for a Patent, except for a design	$15
On issuing each original Patent	$20
On appeal to Commissioner of Patents	$20
On application for Re-issue	$30
On application for extension of Patent	$50
On granting the Extension	$50
On filing a Disclaimer	$10
On filing application for Design (three and a half years)	$10
On filing application for Design (seven years)	$15
On filing application for Design (fourteen years)	$30

The Patent Laws, enacted by Congress on the 2d of March, 1861, are now in full force, and prove to be of great benefit to all parties who are concerned in new inventions.

The law abolishes discrimination in fees required of foreigners, excepting natives of such countries as discriminate against citizens of the United States—thus allowing Austrian, French, Belgian, English, Russian, Spanish and all other foreigners, except the Canadians, to enjoy all the privileges of our patent system (except in cases of designs) on the above terms. Foreigners cannot secure their inventions by filing a caveat; to citizens only is this privilege accorded.

CAVEATS.

Persons desiring to file a caveat can have the papers prepared in the shortest time by sending a sketch and description of the invention. The Government fee for a caveat is $10. A pamphlet of advice regarding applications for patents and caveats is furnished gratis, on application by mail. Address MUNN & CO., No. 37 Park Row New York.

EXTENSION OF PATENTS.

Many valuable patents are annually expiring which might readily be extended, and if extended, might prove the source of wealth to their fortunate possessors. Messrs. MUNN & CO. are persuaded that

© 1864 SCIENTIFIC AMERICAN, INC.

very many patents are suffered to expire without any effort at extension, owing to want of proper information on the part of the patentees, their relatives or assigns, as to the law and the mode of procedure in order to obtain a renewed grant. Some of the most valuable grants now existing are *extended patents*. Patentees, or, if deceased, their heirs, may apply for the extension of patents, but should give ninety days' notice of their intention.

Patents may be extended and preliminary advice obtained, by consulting or writing to MUNN & CO., No. 37 Park Row, New York.

REJECTED APPLICATIONS.

Messrs. MUNN & CO. are prepared to undertake the investigation and prosecution of rejected cases, on reasonable terms. The close proximity of their Washington Agency to the Patent Office affords them rare opportunities for the examination and comparison of references, models, drawings, documents, &c. Their success in the prosecution of rejected cases has been very great. The principal portion of their charge is generally left dependent upon the final result.

All persons having rejected cases which they desire to have prosecuted, are invited to correspond with MUNN & CO., on the subject, giving a brief history of the case, inclosing the official letters, &c.

FOREIGN PATENTS.

Messrs. MUNN & CO., are very extensively engaged in the preparation and securing of patents in the various European countries. For the transaction of this business they have offices at Nos. 66 Chancery lane, London; 29 Boulevard St. Martin, Paris; and 26 Rue des Eperonniers, Brussels. They think they can safely say that THREE-FOURTHS of all the European Patents secured to American citizens are procured through their agency.

Inventors will do well to bear in mind that the English law does not limit the issue of patents to inventors. Any one can take out a patent there.

Circulars of information concerning the proper course to be pursued in obtaining patents in foreign countries through MUNN & CO'S Agency, the requirements of different Government Patent Offices, &c., may be had, gratis, upon application at the principal office, No. 37 Park Row, New York, or any of the branch offices.

SEARCHES OF THE RECORDS.

Having access to all the official records at Washington, pertaining to the sale and transfer of patents, MESSRS. MUNN & CO., are at all times ready to make examinations as to titles, ownership, or assignments of patents. Fees moderate.

INVITATION TO INVENTORS.

Inventors who come to New York should not fail to pay a visit to the extensive offices of MUNN & CO. They will find a large collection of models (several hundred) of various inventions, which will afford them much interest. The whole establishment is one of great interest to inventors, and is undoubtedly the most spacious and best arranged in the world.

MUNN & CO. wish it to be distinctly understood that they do not speculate or traffic in patents, under any circumstances; but that they devote their whole time and energies to the interests of their clients.

COPIES OF PATENT CLAIMS.

MESSRS. MUNN & CO., having access to all the patents granted since the rebuilding of the Patent Office, after the fire of 1836, can furnish the claims of any patent granted since that date, for $1.

THE VALIDITY OF PATENTS.

Persons who are about purchasing patent property, or patentees who are about erecting extensive works for manufacturing under their patents, should have their claims examined carefully by competent attorneys, to see if they are not likely to infringe some existing patent, before making large investments. Written opinions on the validity of patents, after careful examination into the facts, can be had for a reasonable remuneration. The price for such services is always settled upon in advance, after knowing the nature of the invention and being informed of the points on which an opinion is solicited. For further particulars address MUNN & CO., No. 37 Park Row, New York.

ASSIGNMENTS OF PATENTS.

The assignment of patents, and agreements between patentees and manufacturers, carefully prepared and placed upon the records at the Patent Office. Address MUNN & CO., at the Scientific American Patent Agency, No. 37 Park Row, New York.

It would require many columns to detail all the ways in which the Inventor or Patentee may be served at our offices. We cordially invite all who have anything to do with patent property or inventions to call at our extensive offices, No. 37 Park Row, New York, where any questions regarding the Rights of Patentees, will be cheerfully answered.

Communications and remittances by mail, and models by express (prepaid) should be addressed to MUNN & CO. No. 37 Park Row, New York.

Notes and Queries

[A great many correspondents write to us about matters of no importance to any one but themselves, and request answers "by return mail." The Post-office could not carry all the correspondence of this kind if we had time to write it; and for replies to all such letters our friends and readers must look in "Notes and Queries."]

E. L., of N. J.—Flax cotton is manufactured to some extent; there is a factory, we are told, in Toledo, Ohio, using it. Tow is used for making coarser kinds of paper. We cannot give you definite directions for the strength of the chloride solution for bleaching. You had better address H. C. Baird, 406 Walnut street, Philadelphia, for a work on dying.

D. W. G., of N. Y.—You ask us to inform you "if a perpetual motion has ever been invented by man." We answer *no*, and it never can be until man can actually create something out of nothing. The idea of a perpetual motion, as men ordinarily regard it, is now regarded as a ridiculous absurdity by all who understand the laws of dynamics.

F. S., of Ohio.—Many persons have proposed to provide spiral surfaces on the exterior of an elongated projectile, for the purpose of obtaining a rotatory motion by the resistance of the atmosphere when the projectile is fired from a smooth-bore gun and many experiments have been made with differently formed surfaces; but all that we have any knowledge of have been failures. We cannot tell you the comparative cost of rifled and smooth-bore ordnance. We do not consider it practicable to magnetize driving wheels to operate as you propose. The idea of doing so is not new.

G. D., of N. J.—Your mode of signalling the various stations on the railway, so that travellers may know when to get out is old and well known—there are models of the same thing now in the Patent Office.

G. W. P., of Pa.—You will find a process for blackening brass described on page 22, present volume. The cheapest and quickest way to do it is to coat the material with black shellac varnish. This will wear off in time, but it is less trouble for a small job than bothering with acids, &c.

L. W. D., of Conn.—Fuller's earth is first baked and then mixed with pure water. Silver and platinum are used for tipping the points of lightening-rods, but there is no necessity for using any other metal than the iron or copper of which the rod is made.

H. Mc. R., of N. Y.—Of all the formations that which has most puzzled geologists is the "drift." Any man bringing forward a new theory in relation to it, would be obliged, in order to secure attention, to show perfect familiarity with the facts of the case. The proper discussion of the subject would require a book, or, at least a pamphlet, and would be too voluminous for our pages.

J. H., of Ill.—To exclude dampness from brick-work, varnish it with a coating made in the proportion of mixing 8 lbs. of linseed oil with 1 lb. of sulphur, and heating to 278°. We know of no better paint than that made of red lead and linseed oil.

C. B. & Co., of Vt.—The term "new article of manufacture" is very comprehensive. It includes almost everything that is improved. Such patents are the same as if the term "new article" were not used. He who holds the right for a patent may introduce it to the public or not, as he chooses. The statement in the circular is incorrect. If there is a "general smash-up" at the close of the war, the condition of the country will be somewhat jumbled; and if money becomes scarce, people will have less to spend.

J. W. H., of Iowa.—You will find it very difficult to remove the scale from the inside of your steam pipes. A strong solution of soda is used in England with some success, but we cannot speak positively of its virtues.

G. S., of Penn.—You cannot cut off at any point of the stroke with a link motion with economy. When you cut off past a certain point which varies with the construction of the valve, you experience a dead loss, for the steam is not only cut off from the cylinder but shut up in it. In other words the exhaust is closed too soon and back pressure results. Take off your expansion valve which you say is fixed, and put in one with a right-and-left screw, so that by turning the screw you can draw the valves nearer to or further from the center. This will vary the cut without affecting the lead, as does the link.

A. M. R., of Mo.—A great many patents have been granted in this country and in England for water-meters; but thus far they have not been brought much into use.

Money Received.

At the Scientific American Office, on account of Patent Office business, from Wednesday, Feb. 17, 1864, to Wednesday, Feb. 24, 1864:—

W. C. S., of N. Y., $25; F. N., of N. Y., $25; J. H. K., of N. Y., $25; D. M., of N. Y., $25; G. T., of N. Y., $25; H. P., of N. Y., $25; S. Z., of N. Y., $25; W. H. McM., of N. Y., $25; C. B., of N. Y., $25; E. H. D., of N. J., $56; S. & C., of N. Y., $75; D. & N., of N. Y., $25; D. A. G., of N. Y., $22; J. M., of N. Y., $20; J. S., of N. Y., $16; I. V. H., of N. Y., $41; P. S. B., of Mass., $56; G. W. & H. H. F., of N. Y., $16; H. D., of Ohio, $20; G. A. B., of Mass., $30; J. Z., of Ill., $20; L. K., of Conn., $45: P. C., of N. Y., $16; L. & P., of Pa., $20; W. S., of Ohio, $45; J. S., of N. Y., $20; Mrs. S. A. M., of N. Y., $16; J. K., of N. Y., $20; B. W. L., of Austria, $43; J. W. F., of Ill., $42; J. & S., of Mich., $45; A. E. L., of N. Y., $20; C. A., of N. Y., $16; A. B., of N. Y., $16; W. M. K., of N. Y., $20; C. A. C., of N. Y., $16; E. P., of N. Y., $20; J. F. C., of N. Y., $22; C. J. F., of N. J., $20; A. A., of N. Y., $16; J. L. J., of N. Y., $31; J. Van de C., of N. Y., $16; A. J. V., of Ohio, $25; J. P., of N. Y., $41; W. H. F., of Pa., $44; G. A. B., of Mass., $30; B. E. M., of Ill., $16; P. J. C., of Conn., $22; G. C. W., of Ohio, $41; W. M. S., of Mich., $16; J. G. M., of N. Y., $50; G. F. H., of Minn., $16; B. L., of Mich., $159; D. & J. S., of Pa., $25; H. R. T., of Wis., $15; W. B. K., of N. H., $16; H. & L., of Conn., $16; J. P., of Mass., $16; H. A. B., of Pa., $25; T. & R., of Ill., $25; J. A., of Ill., $21; J. F., of Conn., $16; B. & B., of Mass., $16; J. W. F., of Pa., $50; A. K., of Ill., $16; E. J. S., of Md., $16; J. C., of Ohio, $10; P. & H., of N. J., $16; J. S. T., of Pa., $15; J. S., of Mass., $25; T. C. L., of Mass., $16; H. R. B., of Vt., $16; H. P., of Vt., $16; H. A., of N. Y., $16; T. B., of Mass., $25; G. W. M., of Mass., $16; C. R. O., of N. Y., $16; S. P. B., of N. Y., $16; A. H. W., of Iowa, $30; V. & L., of Minn., $25; J. A. H., of Vt., $25; I. H. F., of Ill., $45; M. S., of Mo., $25; H. A. T., of Ill., $10; A. S. H., of N. Y., $10; J. B., of Ohio, $30; H. B., of Conn., $16; G. L., of N. Y., $30; S. S. C., of Conn., $30; G. K. W., of Conn., $22; W. V., of Mich., $15; C. H. W., of N. Y. $16.

Persons having remitted money to this office will please to examine the above list to see that their initials appear in it and if they have not received an acknowledgment by mail, and their initials are not to be found in this list, they will please notify us immediately, stating the amount and how it was sent, whether by mail or express.

Specifications and drawings and models belonging to parties with the following initials have been forwarded to the Patent Office, from Wednesday, Feb. 17, 1864, to Wednesday Feb. 24, 1864:—

W. C. S. of N.Y.; F. N. of N. Y.; J. H. K. of N. Y.; D. M. of N. Y.; T. U. of N. Y.; G. T. of N. Y.; H. P. of N. Y.; S. Z. of N. Y.; W. H. Mc M. of N. Y.; C. B. of N. Y.; E. M. of N. J. (2 cases); S. & C. of N. Y. (2 cases); D. & N. of N. Y.; L. T. L. of [Belgium; W. R. of Russia; I. V. H. of N. Y.; P. S. B. of Mass; B. W. L. of Austria; J. W. F. of Ill.; J. L. J. of N. Y.; P. J. C. of Conn.; H. A. T. of Ill.; J. S. of Mass.; D. & J. S, of Pa.; J. T. R. of N. J.; T. C. of Conn.; T. & R. of Ill.; H. A. B. of Pa.; T. B. of Mass.; C. M. M. of N. J.; A. H. W. of Iowa; M. S. of Mo.; V. & L. of Minn.; J. A. H. of Vt.; J. H. F. of Ill.

RATES OF ADVERTISING.

TWENTY-FIVE CENTS per line for each and every insertion, payable in advance. To enable all to understand how to calculate the amount they must send when they wish advertisements published, we will explain that ten words average one line. Engravings will not be admitted into our advertising columns, and, as heretofore, the publishers reserve to themselves the right to reject any advertisement they may deem objectionable.

OLIVER'S PATENT DRYING KILN, FOR SEASONING and Drying Lumber, the only process that will season thoroughly without checking. Carpenters, Carriage Makers, Coopers, Cabinet Makers, Car Builders, Gun Stock Manufacturers, Sash and Blind Manufacturers, Agricultural Machine Manufacturers, and all Workers in Wood should own a right to use this invention, which consists in certain provisions within a kiln for subjecting the lumber to heat in such a manner as to effectually prevent it from checking. H. W. OLIVER, Patentee, Box 934, New Haven, Conn., or S. C. LEWIS, Whitneyville, Conn. 10 2*

NICHOLSON'S MANUAL OF BOOKBINDING.

A MANUAL OF THE ART OF BOOKBINDING; Containing full Instructions in the different branches of Forwarding, Gilding, and Finishing. Also, the Art of Marbling Book-edges and Paper. The whole designed for the Practical Workman, the Amateur, and the Book-collector. By James B. Nicholson, of the widely-known Philadelphia bookbinding firm of Pawson & Nicholson. Fully illustrated by ornamental designs for the sides and backs of books, drawings of tools, machines, and processes in Bookbinding, and appropriate Samples of Marbled Paper. In one vol., 12mo, price ONE DOLLAR and SEVENTY-FIVE CENTS. Sent by mail free of postage.

CONTENTS:—INTRODUCTION, Sketch of the Progress of Bookbinding. PART I.—Sheet Work. PART II.—Forwarding, the Edges, Marbling, Gilding the Edges, Covering, Half-Binding, Blank-Binding, Boarding, Cloth Work. PART III.—Ornamental Art, Finishing, Taste and Design, Style, Gilding, Illuminated Binding, Blind Tooling, Antique, Coloring, Marbling, Uniform Colors, Gold Marble, Landscape, &c., Inlaid Ornaments, Harmony of Colors, Pasting Down, &c., Stamp or Press Work, Restoring the Bindings of Old Books, Supplying Imperfections in Old Books, Hints to Book Collectors, Technical Terms.

☞ My New Catalogue sent free to any address. Any book on my list sent free of postage at the publication price. HENRY CAREY BAIRD, Industrial Publisher, 406 Walnut street, Philadelphia. 10 2

CONJUGAL RESEMBLANCES, WHERE LOVE begins and ends—Woman's Wages—Matrimony in the way—Money—Its nature, use and abuse—Ethnology, Skulls and national character of the English, Scotch, German, French, Sclavon, Finnish, Circassian, etc.—The Colored Chaplain—Rev. H. M. Turner—His likeness, and a sketch of character—in the March No. Phrenological Journal, 15 cents, or $1 50 a year. FOWLER & WELLS, 308 Broadway, New York. 10 2

SMITH & BUTLER, ORNAMENTAL ELECTROTYPERS.—Medallions and Ornaments in Copper, Brass, and Bronze copied. Bronze and Gilt Ornaments for Sale. 183 William street, New York. 10 2*

ROUND AND SQUARE MATCH MACHINES, Woolen Cards, Rag Pickers, &c., Manufactured by RICHARDSON & CO., Athol Depot, Mass. 10 13*

THE COLOR OF YOUR EYES. Language of Blue Eyes, Black Eyes, Brown Eyes, Hazle Eyes, Gray Eyes, Green Eyes, Children's Eyes, and the Eyes of Celebrated Persons—Poetry of the Eyes—

The bright black eye, the melting blue,
I cannot choose between the two;
But that is dearest all the while,
Which wears for us the sweetest smile.

and much more on the same subject, in the Phrenological Journal for March, now ready, only 15 cents, or $1 50 a year. Address FOWLER & WELLS, 308 Broadway, New York. 10 2

FOR SALE.—THE PATENT FOR McDONALD'S SCREW WRENCH.—This is a superior Wrench in every respect. It is a time-saving tool. It will open wider, easier, and quicker than any Wrench in use. It is particularly adapted for Plumbers and Engineers. Being simple in its construction, is not liable to get out of order. For Illustration of this tool, see SCIENTIFIC AMERICAN of Jan. 9, 1864. Persons wishing to purchase the Patent, or take an interest in the Manufacture, can address JOHN MORRISON, Park Hotel, New York; or at Dubuque, Iowa. 10 1*

THE "JERKS," OR CONVULSIONS, WHEN UNDER religious exercises—Wonderful phenomena in France—Causes explained—A change of Heart—The Future American—White, Red, or Brown—which! What we want—Fruit growing—Aunt Nabby, or the Surprise Party—Superstitions, in Great Britain and Ireland, Leath Tokens, Signs of Misfortune, Witch Guards—Irish Fairies—Rain at a Funeral—Trying Fortunes, etc., in March No. Phrenological Journal. Only 15 cts., or $1 50 a year. FOWLER & WELLS, 308 Broadway, New York. 10 2

TEMPLETON ON STEAM AND THE STEAM ENGINE.

THE PRACTICAL EXAMINATOR, OR STEAM AND THE STEAM ENGINE; with Instructive References relative thereto. Arranged for the use of Engineers, Students, and others. By William Templeton, Engineer. In one vol., 12mo., price SEVENTY-FIVE CENTS. Sent free of postage to any address. This little volume, which was originally intended solely for the Author's own private use, has been pronounced by Engineers one of the most valuable books on the Steam Engine ever published. On the strength of the high commendation it has received from men competent to judge of its merits, and the large and rapidly increasing demand for it among Engineers in the Navy, and others, the publisher recommends it to the consideration of the Engineering Profession with very great confidence.

☞ My New Catalogue of Practical and Scientific Books, containing many announcements of New Books in preparation, sent by mail free to any one applying for it. Any book on my list sent free of postage at the publication price. HENRY CAREY BAIRD, Industrial Publisher, 406 Walnut street, Philadelphia. 10 3

H. N. WINANS, NEW YORK.—I USED YOUR INCRUSTATION-POWDER in our five Boilers with entire satisfaction, and believe every pound judiciously used will save from Five to Seven Dollars in Fuel, to say nothing of the saving by keeping the boiler clean and free from scale.—J. O. LORD, Engineer, State Hospital, Jacksonville, Ills. 10 2*

GUN AND PISTOL SCREWS.—COMSTOCK, LYON & CO., Manufacturers (Office, 74 Beekman street, New York), are always prepared to furnish Gun and Pistol Screws to sample, Screws to fit the U. S. Musket, Sewing Machine Screws, and Metal Screws generally, of the best quality, at short notice. 10 26

THE NILE EXPLORERS, CAPTAINS SPEKE AND GRANT, with likenesses, including their Africans—An African Beauty, How he got two wives—The Science of Force, Magnetism, Water, Iron, Combustion, Origin of Vegetation—What Mind is made of—The Breath of Life—Wonders of Creation—The Microscope—Monads, Birds, Physiological and Stellar Wonders, in March No. Phrenological Journal, 15 cts. FOWLER & WELLS, New York. 10 2

TO INVENTORS, MANUFACTURERS, &C.—AN EXPERIENCED PATENT AGENT, just closing an engagement, will undertake the Sale of a Good Patent, or Manufactured Article of Merit. Good reference. Address A. B. HOLMES, Dowagiac, Mich., with all particulars. 10 2*

© 1864 SCIENTIFIC AMERICAN, INC.

A VALUABLE WORK FOR INVENTORS PATENTEES AND MANUFACTURERS.

The publishers of the SCIENTIFIC AMERICAN have just prepared with much care, a pamphlet of information about Patents and the Patent Laws, which ought to be in the hands of every inventor and patentee, and also of manufacturers who use patented inventions. The character of this useful work will be better understood after reading the following synopsis of its contents :—

The complete Patent Law Amendment Act of 1861—Practical Instructions to Inventors, how to obtain Letters Patent, also about Models—Designs—Caveats—Trade-marks—Assignments—Revenue Tax—Extensions—Interferences—Infringements—Appeals—Re-issues of Defective Patents—Validity of Patents—Abandonment of Inventions—Best Mode of Introducing them——Importance of the Specification—Who are entitled to Patents—What will prevent the granting of a Patent—Patents in Canada and European Patents—Schedule of Patent Fees ; also a variety of miscellaneous items on patent law questions.

It has been the design of the publishers to not only furnish, in convenient form for preservation, a synopsis of the PATENT LAW and PRACTICE, but to answer a great variety of questions which have been put to them from time to time during their practice of upwards of *seventeen years*, which replies are not accessible in any other form. The publishers will promptly forward the pamphlet by mail, on receipt of six cents in postage stamps.

Address MUNN & CO., Publishers of the SCIENTIFIC AMERICAN, No. 37 Park Row, New York.

SALE OF CONDEMNED NAVY CANNON.

BUREAU OF ORDNANCE, NAVY DEPARTMENT,
WASHINGTON CITY, Feb. 17, 1864.

Notice is hereby given that on the 1st day of March next, at 12 o'clock, M., there will be sold, at public auction, at the Navy Yard, Brooklyn, N. Y.

One hundred and six (106) 32-pounders of 61 cwt.

These guns are to be sold by the pound, and one-half the purchase-money is to be paid at the completion of the sale, and the other half upon the removal of the guns by the purchaser, which removal must take place within ten days after the sale, and at the expense of said purchaser.

H. A. WISE, Chief of Bureau.
1

MATCH-STICKER.—THE UNDERSIGNED WISH TO purchase a new or second-hand machine for making match sticks and setting them into frames ready for dipping. Address W. T. BROWN & CO., Portland, Me. 9 2*

NEW YORK STATE BUSINESS DIRECTORY, 1864. CONTAINING THE NAMES, BUSINESSES AND ADDRESSES of all Merchants, Manufacturers and Professional Men throughout the State. Also lists of Insurance, Railroad and Manufacturing Companies, Banks, Post Offices, Newspapers, Academies, &c., &c.

By ADAMS, SAMPSON & CO., Directories Publishers, No. 91 Washington street, Boston, Mass., and 78 State street, Albany, N. Y.

☞ CAUTION.—The Public are hereby cautioned against paying MONEY IN ADVANCE, for Advertisements, to any person representing himself to be our agent, as such persons are in no way connected with us, and should be treated as imposters.

Our agents never ask for money in advance of publication. 9 5*

THE CARPENTER'S AND JOINER'S HAND-BOOK. Published by H. W. HOLLY, Architect and Builder, Norwich, Conn., is sent to any address prepaid, by the publisher, on receipt of 60 cents. 9 2*

BAIRD'S PATENT

INCRUSTATION PREVENTER, AND REMOVER, FOR STEAM BOILERS in either Salt or Fresh Water.—No invention connected with Steam Power combines so many advantages as this. THE ECONOMY IN FUEL ALONE, from its use, repays the cost of the preventive. Certificates from Engineers and owners of Steam Boilers, at sea and on shore, can be seen at the office of JAS. F. LEVIN, 23 Central Wharf, Boston, Mass. 9 10*

AGENCY FOR THE INTRODUCTION AND SALE OF PATENT INVENTIONS.—Inventors and manufacturers desirous of having their inventions introduced into this country and abroad, will find it to their interest to send descriptive, illustrated pamphlets or circulars to A. SCHELLER, 370 Bowery, New York. 8 3*

STEAM ENGINES AND BOILERS OF EVERY DESCRIPTION ; Shafting ; Pulleys and Machinists' Tools, for Sale by C. GAY, 29 Doane street, Boston, Mass. 9 20*

HEMP, FLAX AND JUTE PREPARING AND SPINNING Machinery, new and second-hand, all built on the most improved system. All kinds of Steel-pointed Wood Clothing and Leather Filletting. Hackles, Gills, and Gill Pins. Sole Agent for Grimston's Patent Self-acting Balling Machine. Also, the Excelsior Horner's Heckling Machine—producing more yield, with less labor, than any machine heretofore known. THOMAS JENNINGS, Machinery Merchant, Leeds, England. 9 6*

PATENTED JAN. 26TH, 1864.

MORSE'S DOUBLE SCALE SELF-REGISTERING CALIPERS—Illustrated in Vol. 10, No. 9, of SCIENTIFIC AMERICAN. One half or the whole Right for sale, very low; or a responsible party would be licensed to manufacture. Address WM. A. MORSE, Boston, Mass. 9 4*

PECK'S PATENT DROP PRESS FOR FORGING PURPOSES.—All sizes manufactured by MILO PECK & CO., New Haven, Conn. 9 12*

FOR SALE.—A MACHINE-SHOP AND IRON FOUNDRY now in successful operation in the city of Chicago, Ill. The machine tools are all nearly new and in first-rate order. The foundry is capable of making three tuns castings per day, and is fully employed. In connection with the machine-shop is a pattern shop and a good assortment of patterns for steam engines and general machinery, which is the class of work the shop has been engaged in for the last twelve years. This is an excellent opening for any party wishing to engage in a business ready made, as the shop has a good reputation for doing first-class work. Capital required, from fifteen to twenty thousand dollars; reason for selling—the owner wishes to change his location. For particulars address Post-office Box 1,223, Chicago, Ill. 8 4*

ENGINEERS AND MACHINISTS ARE SCIENTIFICALLY prepared for all the duties in Marine Engineering, for the United States Navy or the Merchant Service. Address with a stamp or apply to J. HARRIS, 355 North 10th street, Philadelphia, Pa. 8 4*

TO WIRE DRAWERS.—I have patented and brought into practical operation, a Machine for Pointing Wire in the Coil for drawing, without the use of files or emery, and for pointing all kinds and sizes of wire where a perfect taper is required.

C. JILLSON, Worcester, Mass. 9 8*

MACHINERY, SLIDE LATHES, IRON PLANING Machines, Upright Drills, Bolt-cutting Machines, Chucks, &c. A few desirable sizes at Philadelphia Machinery Depot, 135 North 3d street, Philadelphia, Pa., CHARLES H. SMITH. 8 4*

HYDROMETERS FOR TESTING THE QUALITY OF milk. Tells the percentage above the standard for pure milk, or detects the presence of water, and also the amount of water introduced. One dozen by Express for $4; single instrument 50 cents, by mail post-paid. Address HYDROMETER CO., Worcester, Mass. 8 4*

THE NEW YORK EMERY-WHEEL COMPANY ARE prepared to fill all order for their improved Emery Wheels. Sample wheels sent on and receive price as per circular. For cutting a grinding a wheel will save its cost in one day's work. Smyrna emery by the keg, warranted and best quality. Office 51 Beekman street, New York. 9 3*

FOR SALE.—TWO PAIRS OF LONG BELLOWS, ARranged with Walking Beam connected at each end. Total length of the two 15 feet, width 4 feet. Also, two Cylinder Blowers, 26-inch diameter, 26-inch stroke, made to work together or separately. The above will be sold low, if application is made soon. Providence Tool Company Armory, Providence, R. I. 8 3*

JAMES HORNER & CO., MANUFACTURERS OF CAST Steel and Files. Orders solicited for all kinds, shapes and sizes. Office and Warehouse, 28 Cliff street, New York. 7 6m*

SELF-REGISTERING CALIPERS.—GIVING THE sizes without recourse to a rule. See engraving in SCIENTIFIC AMERICAN, of Aug. 8, 1863; 1¼-inch (pocket) size, at 75 cents; 2-inch size (with set screw attached to indicator), $1 25. Now ready and will be delivered free of expense to purchasers on receipt of the price. A limited number of the 3-inch sizes are in process to supply demand only. Early orders will secure them. Larger sizes will be made if sufficient orders are received. Send for illustrated circulars. Liberal discount to the trade. Reliable agents wanted for all parts of the United States. KIMBALL & TALBOT, Worcester, Mass. 7 8*

BATES'S PATENT GRAVITATING STEAM AND VACUUM GAUGE.—Particular attention paid to repairing and testing Steam Gauges and other Engine Room Instruments. KEEN, BROTHER & CO., Proprietors and Manufacturers. Office—197 Greenich street, New York City; Manufactory—40 Wayne street, Jersey City. 9 4*

18-INCH PIPE FOR SALE.—WE HAVE ON HAND about 4,200 feet of New Cast-iron Socket-pipe, 18 inch. internal diameter, in lengths to lay 12 feet each. Each piece weighs about 1,600 lbs. and has been proved at a pressure of 300 lbs. per square inch. Parties wishing to purchase the whole or a portion of the above, will please address, LOWELL GAS-LIGHT COMPANY, Lowell, Mass.—O. E. CUSHING, Agent. 7 6*

INCRUSTATION—A POSITIVE REMEDY AND NO injury. Satisfaction guaranteed. Send for circular. H. N. WINANS, 11 Wall street, New York. 7 4*

AMERICAN NEEDLE COMPANY, 442 BROADWAY, New York, J. W. Bartlett. Needle manufacturers for all the Sewing Machines. Bartlett's Burnished Hand Needles.

"We find Bartlett's Burnished Needles a wonderful improvement over others for sewing machine or hand sewing."—MME. DEMOREST.

Hackle, Gill, Comb, Card Pins, &c., &c. 7 4*

SAVING OF FUEL TO PARTIES USING STEAM.—DAMPER REGULATORS.

Guaranteed to effect a great saving in fuel and give the most perfect regularity of power. For sale by the subscribers, who have established their exclusive right to manufacture damper regulators, using diaphragms of flexible vessels of any kind. CLARK'S PATENT STEAM AND FIRE REGULATOR COMPANY, No. 5 Park Place, New York 24 26*

THERMOMETERS!!! OF SUPERIOR FINISH AND accuracy, for the use of manufacturers, chemists, brewers, dyers, &c. Also register and standard thermometers manufacted by CHARLES WIEDER, Peterboro', N. H.

The trade supplied. 79 11 13 4*

WM. CLEVELAND HICKS, CIVIL AND MECHANICAL Engineer, 480 Broadway, New York.

PORTABLE STEAM ENGINES—COMBINING THE maximum of efficiency, durability and economy with the minimum of weight and price. They are widely and favorably known, more than 200 being in use. All warranted satisfactory or no sale. A large stock on hand ready for immediate application. Descriptive circulars sent on application. Address J. C. HOADLEY, Lawrence, Mass. 5tf

---

PORTABLE STEAM ENGINES OF ALL SIZES, ON hand and built to order. Send for description and our prices, and get the best, cheapest, and most economical Engine made.

5 10 * HOAG & HAMPSON, 96 Maiden Lane, N.Y.

WHAT EVERY ONE OUGHT TO HAVE—ONE OF Parr's Tool Chests, fitted with complete sets of tools, sharpened and set ready for use and packed in cases for shipping, suitable for mechanics, amateurs, farmers and boys. Prices from $2 to $35 each, and containing from 8 to 92 tools, according to size. To be obtained of all respectable hardware dealers or shipped on receipt of price by the manufacturer, GEORGE PARR, Buffalo, N.Y. Send for descriptive circular. 25 14*

NERVOUS DISEASES AND PHYSICAL DEBILITY, arising from Specific causes in both sexes—new and reliable treatment, in Reports of the Howard Association—sent in sealed letter envelopes, free of charge. Address Dr. J. SKILLIN HOUGHTON, Howard Association, No. 2 South Ninth street, Philadelphia, Pa. 24 12*

IT IS SO.—THF BEST WASHING AND WRINGING MACHINES are under M. Van Auken's Patents. Send for circulars to Amsterdam, N. Y. 8 5*

REYNOLD'S TURBINE WATER-WHEELS.—THESE celebrated water-saving and powerful wheels, now so extensively used on limited streams, are furnished and adapted to every head and supply of water, by TALLCOT & UNDERHILL, 170 Broadway, New York. 8 5

WOODRUFF'S PATENT PORTABLE BAROMETERS. The best, cheapest, and only perfectly portable Barometer. Prices $5, $8, $12, $15 and $20. Sent to any address, and safe carriage warranted on receipt of price. Local and travelling agents wanted. Send for circulars CHARLES WILDER, Peterboro', N. H.

6 8 10 12 4*

ANILINE DYES.—ANILINE DYES OF EVERY known shade. Fuchsine, Magenta, Violet, Blue, Green, Brown, &c., made and sold by THOMAS HOLLIDAY & Co., Town Bridge Color Works, Huddersfield. 2 6 e o w

---

ANILINE, TOLUODINE, BENZOLE, NITRO-BENZOLE, Naphthaline, Coal and Wood Naphtha, Arsenic Acid, Carbolic, Phenic and Picric Acids, manufactured by READ HOLLIDAY, Tar Works, Huddersfield, and 128 Holborn Hill, London. 2 6 eow

---

MACHINERY.—S. C. HILLS, No. 12 PLATT STREET, New York, dealer in Steam Engines, Boilers, Planers, Lathes Chucks, Drills, Pumps ; Mortising, Tenoning and Sash Machines Woodworth's and Daniels' Planers, Dick's Punches, Presses and shears ; Cob and Corn Mills ; Harrison's Grist Mills ; Johnson Shingle Mills ; Belting, Oil, &c. e

---

SCIENTIFIC BOOKS AND PERIODICALS, ENGLISH French, and American, in every department, in stock and imported to order, by the single copy or in quantity—offered by JOHN WILEY, 535 Broadway, New York.

☞ Scientific Catalogues gratis on application. 7 6eow

AMESSIEURS LES INVENTEURS.—AVIS IMPORTANT. Les inventeurs non familiers avec la langue Anglaise, et qui préféreraient nous communiquer leurs inventions en Français, peuvent nous addresser dans leur langue natale. Envoyez nous un dessin et une description concise pour notre examen. Toutes communications seront regues en confidence. MUNN & CO.,

Scientific American office, No. 37 Park Row New York

THE CHEAPEST MODE OF INTRODUCING INVENTIONS.

INVENTORS AND CONSTRUCTORS OF NEW AND useful Contrivances or Machines, of whatever kind, can have their inventions illustrated and described in the columns of the SCIENTIFIC AMERICAN on payment of a reasonable charge for the engraving.

No charge is made for the publication, and the cuts are furnished to the party for whom they are executed as soon as they have been used. We wish it understood, however, that no second-hand or poor engravings, such as patentees often get executed by inexperienced artists for printing circulars and handbills from, can be admitted into these pages. We also reserve the right to accept or reject such subjects as are presented for publication. And it is not our desire to receive orders for engraving and publishing any but good Inventions or Machines, and such as do not meet our approbation in this respect, we shall decline to publish.

For further particulars address—

MUNN & CO.,
Publishers of the SCIENTIFIC AMERICAN,
No. 37 Park Row, New York City

OIL! OIL! OIL

For Railroads, Steamers, and for machinery and Burning. PEASE'S Improved Engine and Signal Oil, indorsed and recommended by the highest authority in the United States. This Oil possesses qualities vitally essential for lubricating and burning, and found in no other oil. It is offered to the public upon the most reliable, thorough and practical test. Our most skillful engineers and machinists pronounce it superior to and cheaper than any other, and the only oil that is in all cases reliable and will not gum. The "Scientific American," after several tests, pronounces it "superior to any other they have ever used for machinery." For sale only by the Inventor and Manufacturer, F. S. PEASE, No. 61 Main street, Buffalo, N. Y.

N. B.—Reliable orders filled for any part of the United States and Canada. 1 13*

CONES FOR UNITED STATES MUSKETS, ENFIELD and Austrian Rifles, and for the Shells of Rifled Cannon, promptly supplied in any quantities and warranted to pass Government inspection. Also second quality cones of above models, and cones for sporting guns and pistols. Address COLE, BROTHER & TILDEN, General Machinists, Pawtucket, R. I.

N. B.—Also manufacture every description of improved Reed Machinery. 3 10*

BISULPHIDE OF CARBON, CHEMICALLY PURE, for sale in quantities from one to fifty carboys. Address DU BOIS D. PARMELEE, Chemist, 22 East 41st street, New York. 1 13*

PAGE'S PATENTED LIME KILN WILL BURN 300 bushels lime per day, with three cords wood or 1¾ iron coal, hard or soft. Address C. D. PAGE, Grand Rapids, Mich. 4 13*

HOLSKE & KNEELAND, MODEL MAKERS. PATENT Office Models, Working Models, and Experimental Machinery, made to order at 100 Walker street, between Center and Elm, New York. Refer to Munn & Co., SCIENTIFIC AMERICAN Office. 6tf

---

FAN BLOWERS—DIMPFEL'S, ALDEN'S, McKENZIE'S and others, for Steamboats, Iron Works, Founderies, Smith Shops, Jewelers, &c., on hand for sale by LEACH BROTHERS, 86 Liberty street, New York. 3 15*

VULCANIZED RUBBER—

Adapted to mechanical purposes—MACHINE BELTING, STEAM PACKING, VALVES, HOSE, EMERY VULCANITE WHEELS, &c., &c. Directions, prices, &c., can be obtained on application to the NEW YORK BELTING AND PACKING COMPANY,
Nos. 37 and 38 Park Row, New York.
JOHN H. CHEEVER, Treasurer. 1tf

GROVER & BAKER'S CELEBRATED SEWING MACHINES were awarded the highest premiums over all competitors at the recent State Fairs of New York, Vermont, Iowa, Michigan, Indiana, Illinois, Kentucky, Pennsylvania, Ohio, and at every Institute and County Fair where exhibited this year. Salesrooms 495 Broadway, New York. 19tf

---

GUILD & GARRISON'S CELEBRATED STEAM Pumps—Adapted to every variety of pumping. The principal styles are the Direct Action Excelsior Steam Pump, the improved Balance Wheel Pump, Duplex Vacuum and Steam Pumps, and the Water Propeller, an entirely new invention for pumping large quantities at a light lift. For sale at Nos. 55 and 57 First street, Williamsburgh, and No. 74 Beekman street, New York.
1tf GUILD, GARRISON & CO.

BLACK DIAMOND STEEL WORKS, PITTSBURGH, Pa. PARK BROTHER & CO., manufacturers of best quality Refined Cast Steel, square, flat and octagon, of all sizes. Warranted equal to any imported or manufactured in this country. Office and Warehouse, Nos. 149 and 151 First street, and 120 and 122 Second street, Pittsburgh, Pa. vol 8 11 1y*

WHEELER & WILSON'S HIGHEST PREMIUM SEWING MACHINES and Foote's Patent Umbrella Stands, 505 Broadway, New York. 17 33

IRON PLANERS, ENGINE LATHES, DRILLS AND other machinists' tools, of superior quality, on hand and finishing, for sale low. For description and price address NEW HAVEN MANUFACTURING COMPANY, New Haven, Conn. 1tf

---

BOLTS, NUTS AND WASHERS OF ALL SIZES constantly on hand for sale by LEACH BROTHERS, 86 Liberty street, New York. 3 13*

Zur Beachtung für deutsche Erfinder.

Die Unterzeichneten haben eine Anleitung, die Erfindern das Verhalten angibt, um sich ihre Patente zu sichern, herausgegeben, und verabfolgen solche gratis an dieselben.

Erfinder, welche nicht mit der englischen Sprache bekannt sind, können ihre Mittheilungen in der deutschen Sprache machen. Skizzen von Erfindungen mit kurzen, deutlich geschriebenen Beschreibungen beliebe man zu addressiren an

Munn & Co.,
37 Park Row, New York.

Auf der Office wird deutsch gesprochen.

Daselbst ist zu haben :

Die Patent-Gesetze der Vereinigten Staaten.

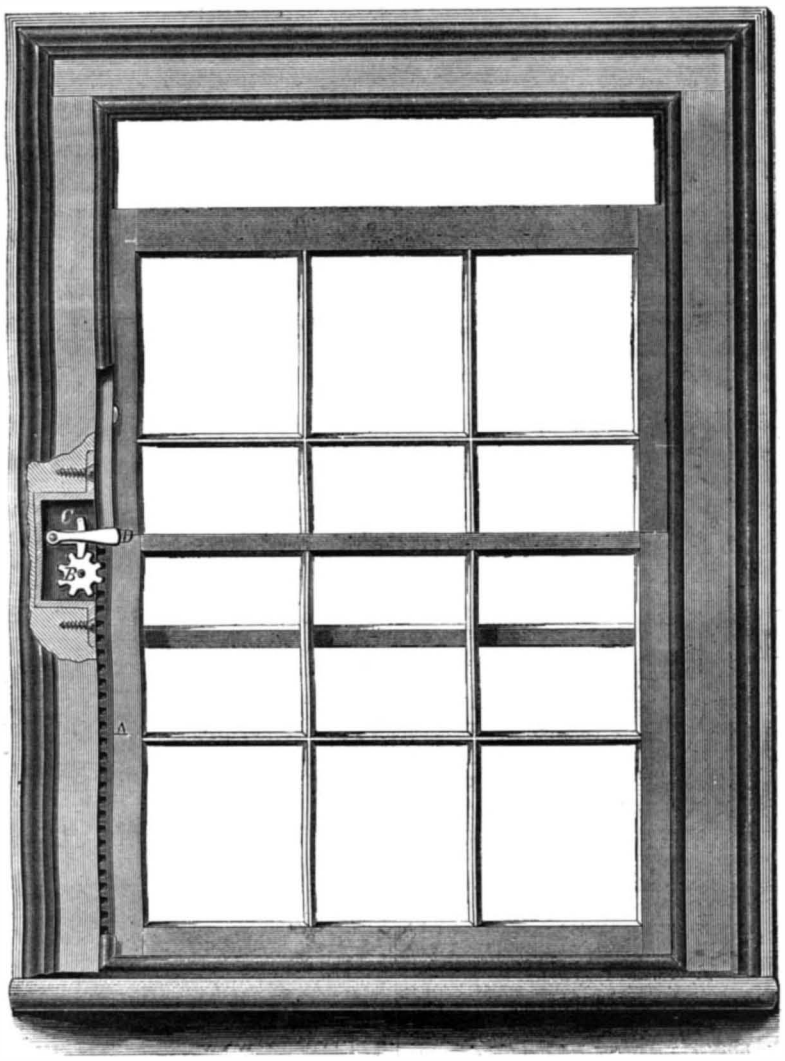
nebst den Regeln und der Geschäftsordnung der Patent-Office und Anleitungen für den Erfinder, um sich Patente zu sichern, in den Ver. St. sowohl als in Europa. Ferner Auszuge aus den Patent-Gesetzen fremder Länder und darauf bezügliche Rathschläge ; ebenfalls nutzliche Winke für Erfinder und solche welche patentiren wollen.

Preis 20 Cts., per Post 25 Cts.

© 1864 SCIENTIFIC AMERICAN, INC.

Improved Window-sash Stop.

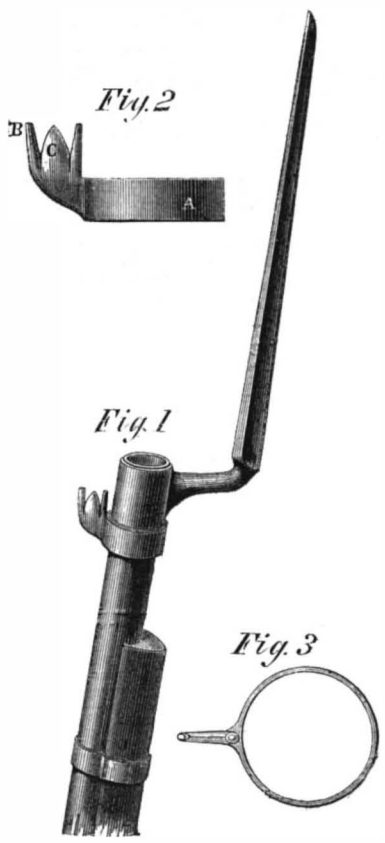
It is a decidedly unpleasant sensation to raise a window-sash and have the same suddenly give way and drop on one's head. Sash weights and cords are good to balance window-sashes and prevent the accident alluded to; but they soon get frayed out, and require to be renewed. With a good mechanical fixture for the purpose, a window-sash works to perfection; and is never an annoyance from the causes mentioned. The stop herewith illustrated is simple in construction and design, being nothing more than a rack, A, secured to the sash frame, and a pinion, B, set in a small iron case on the side of the frame. This pinion has a pawl, C, working in the teeth, in such a manner that it can be liberated at any moment desired, by simply pressing on the latch, D. When this is done the sash descends, and may be sustained at any point by relaxing the pressure on the pawl. By this arrangement it will be seen that no springs are needed, the mere elevation or depression of the pawl being all that is required to operate the sash. There is nothing visible outwardly but the small handle of the pawl, our engraving being merely broken away to show the inner parts. There is but one stop on each sash. This sash-stop is the invention of R. W. Clough, of 191 South 5th street, Williamsburgh, N. Y.. and was patented through the Scientific American Patent Agency, on Jan. 5th, 1864; further information can be had by addressing either the inventor or E. G. Vyse, 33 Grand street, Williamsburgh.



CLOUGH'S WINDOW-SASH STOP.

KELLY'S CARTRIDGE-TEARER.

Singular as the statement may appear to some, it is said to be true that the simple act of biting off the end of the cartridge in battle becomes a source of great distress to the soldier when many times repeated. This is owing to the niter in the powder, which causes intense thirst, amounting in course of time to suffocation. If this be true, then the simple device herewith illustrated is a decided acquisition to the long list of inventions called forth by the war; for by its use the loose end of the paper cartridge is torn off without the necessity of using the soldier's teeth for the purpose. The appliance is simply a steel ring, A, as shown in Figs. 1, 2 and 3, with two horns, B, and a tooth or blade, C, between them. The operation is as follows :—The loose end of the cartridge is placed between the two horns and pressed on the fleam-shaped tooth; by simply pulling the cartridge away the end is torn off and the contents may be poured into the barrel; all this is done with one hand, and in a short practice can be performed as dexterously as by the old-fashioned way and with much greater comfort to the soldier. The ring can be made so as to turn up against the barrel when not in use. A patent was granted on this invention, through the Scientific American Patent Agency, on Dec. 16, 1862, to Daniel Kelly, of Grand Rapids, Mich. For further information address the inventor at that place.



IGNORANCE IS BLISS.—We see "dandelion coffee," advertised for sale in some quarters. Rye coffee was common, years ago. Chickory passes current for coffee, now, in too many places. Burnt beans do duty in the same shape. In England, old coffins, dug out of crowded church-yards, are taken and burned, and some only dried and ground; but all used for adulterating the popular breakfast material. It communicates to poor coffee a good color. It puts *body* into it, in one sense, if contrary to the spirit of trade; and if in Dickens' story, the widow's sausages were wonderfully superior until a button of her missing husband's coat was found in one of them, the would-be Mocha might as well acquire a startling flavor from the aroma of mortality borrowed from the cemetery. It will not do to inquire too curiously, at any time, into what we eat and drink. Where "ignorance is bliss," it is, indeed, "folly to be wise."

THE

Scientific American,

FOR 1864!

VOLUME X.—NEW SERIES.

The publishers of the SCIENTIFIC AMERICAN respectfully give notice that the Tenth Volume (New Series) commenced on the first of January. This journal was established in 1845, and is undoubtedly the most widely circulated and influential publication of the kind in the world. In commencing the new volume the publishers desire to call special attention to its claims as

A JOURNAL OF POPULAR SCIENCE.

In this respect it stands unrivaled. It not only finds its way to almost every workshop in the country, as the earnest friend of the mechanic and artizan, but it is found in the counting-room of the manufacturer and the merchant; also in the library and the household. The publishers feel warranted in saying that no other journal now published contains an equal amount of useful information; while it is their aim to present all subjects in the most popular and attractive manner.

The SCIENTIFIC AMERICAN is published once a week, in convenient form for binding, and each number contains sixteen pages of useful reading matter, illustrated with

NUMEROUS SPLENDID ENGRAVINGS

of all the latest and best inventions of the day. This feature of the journal is worthy of special note. Every number contains from five to ten original engravings of mechanical inventions relating to every department of the arts. These engravings are executed by artists specially employed on the paper, and are universally acknowledged to be superior to anything of the kind produced in this country.

The publishers of the SCIENTIFIC AMERICAN promise to present as during preceding years, all the latest improvements in Steam Engineering, War Vessels, Ordnance—military and naval, Fire-arms Mechanics' Tools, Manufacturing Machinery, Farm Implements, Wood-working Machinery, Water-wheels, Pumps and other Hydraulic Apparatus, Household Utensils, Electric, Chemical and Mathematica Instruments, Flying Machines and other Curious Inventions—besides all the varied articles designed to lighten the labor of mankind, not only in the shop and warehouse, but in every place where the industries of life are pursued.

From its commencement the SCIENTIFIC AMERICAN has been the earnest advocate of the rights of American Inventors and the

REPERTORY OF AMERICAN PATENTS.

In this important department, so vitally connected with all the great interests of the country, no other journal can lay any claim whatever, as in its columns there is published a weekly Official List of the "Claims" of all patents granted at the U. S. Patent Office.

THE PRACTICAL RECIPES

alone are oft-times worth more to the subscriber than the amount of a whole year's subscription.

TERMS OF SUBSCRIPTION.

Two volumes of the SCIENTIFIC AMERICAN are published each year, at $1 50 each, or $3 per annum, with correspondingly low terms to Clubs; $1 will pay for four months' subscription. The numbers for one year, when bound in a volume, constitute a work of 832 pages of useful information, which every one ought to possess. A new volume will commence on the first of January, 1863.

Club Rates.

Five Copies, for Six Months	$6
Ten Copies, for Six Months	12
Ten Copies, for Twelve Months	18
Fifteen Copies, for Twelve Months	24
Twenty Copies, for Twelve Months	40

For all clubs of Twenty and over, the yearly subscription is only $2 00. Names can be sent in at different times and from different Post-offices. Specimen copies will be sent gratis to any part of the country

Canadian subscribers will please to remit 25 cents extra on each year's subscription to pre-pay postage.

Munn & Co., Publishers.

37 Park Row, New York

FROM THE STEAM PRESS OF JOHN A. GRAY & GRI

© 1864 SCIENTIFIC AMERICAN, INC.